October, 1945 Vol. 34, No. 8

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

PROJECTS NUMBER

The Shop Teachers' Professional Magazine

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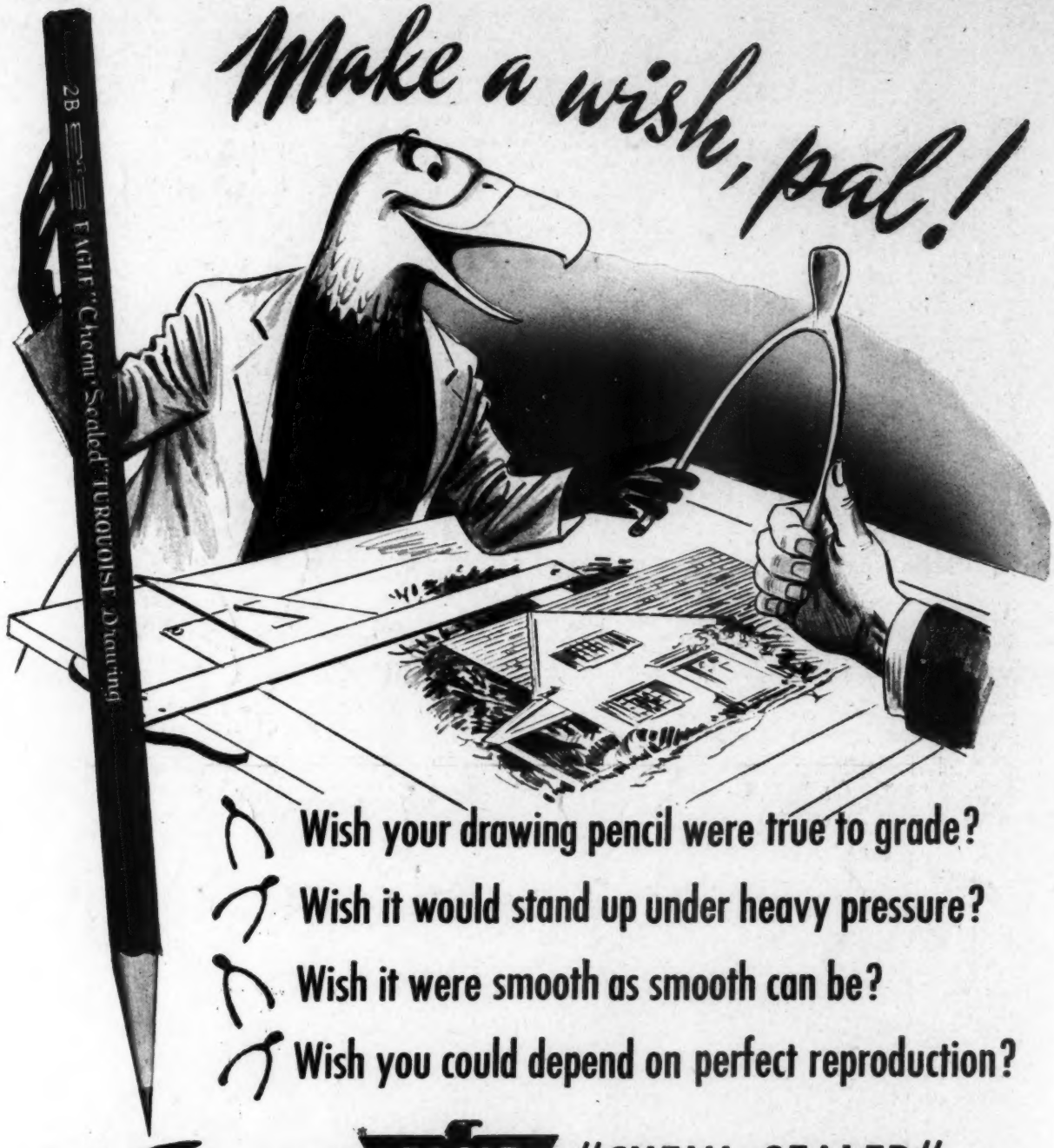

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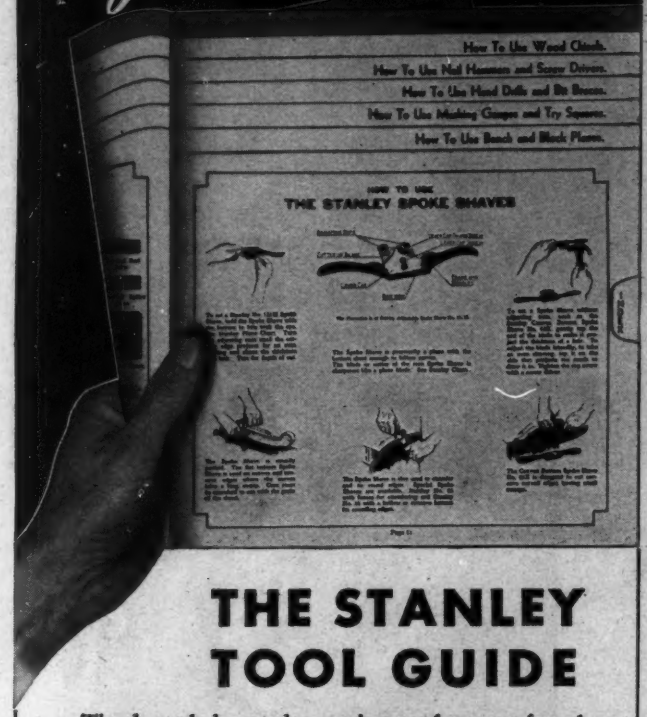
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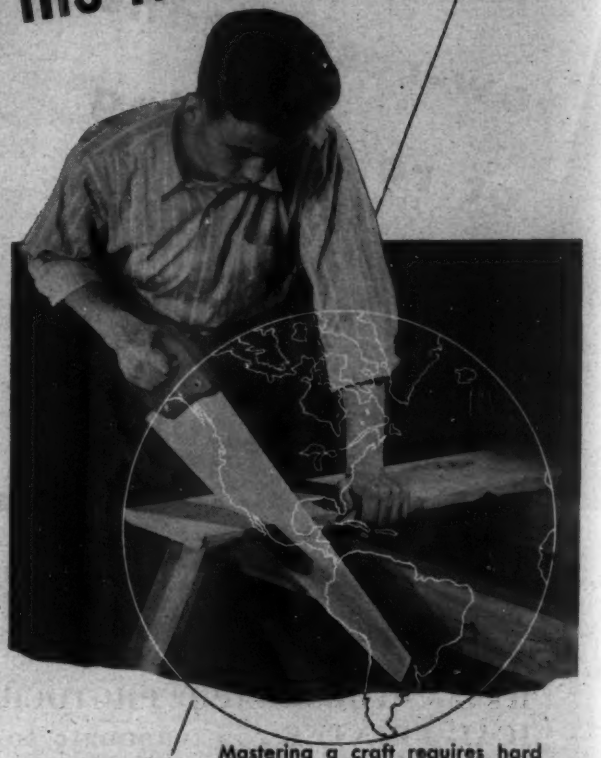

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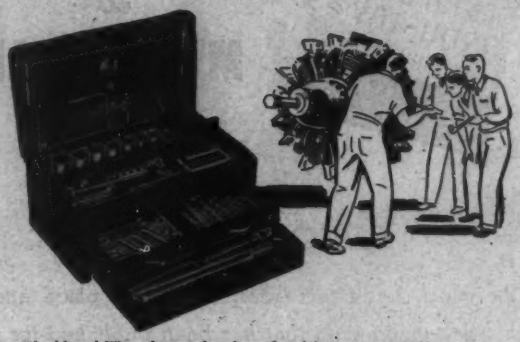

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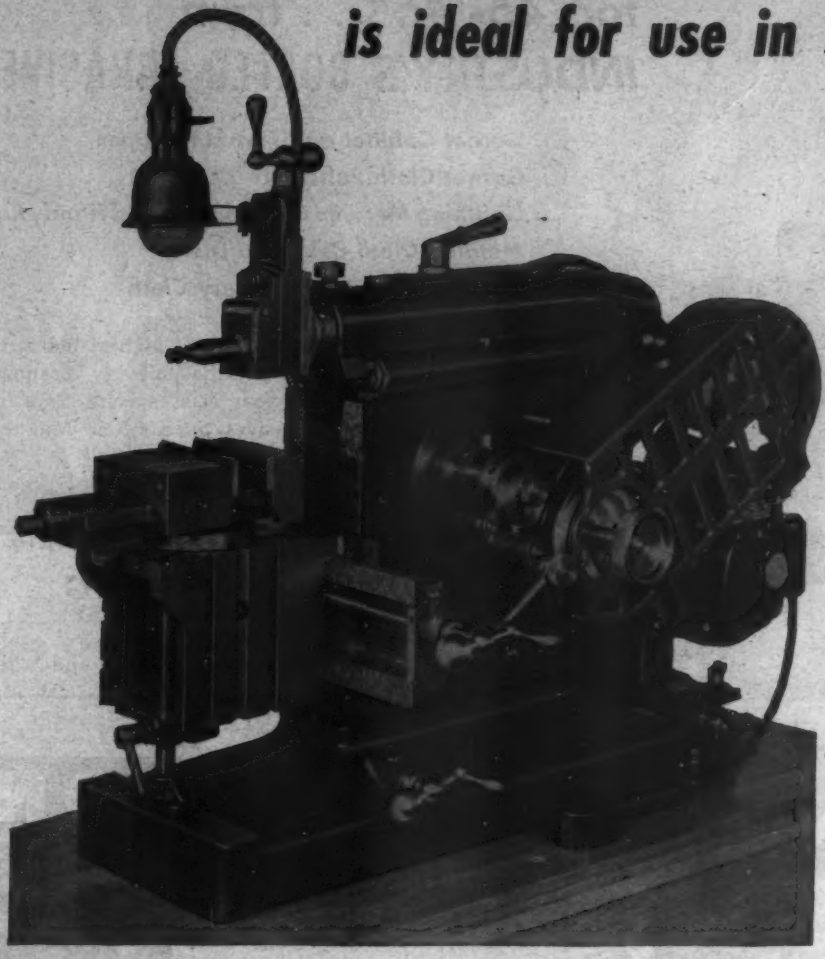

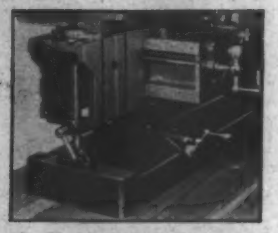

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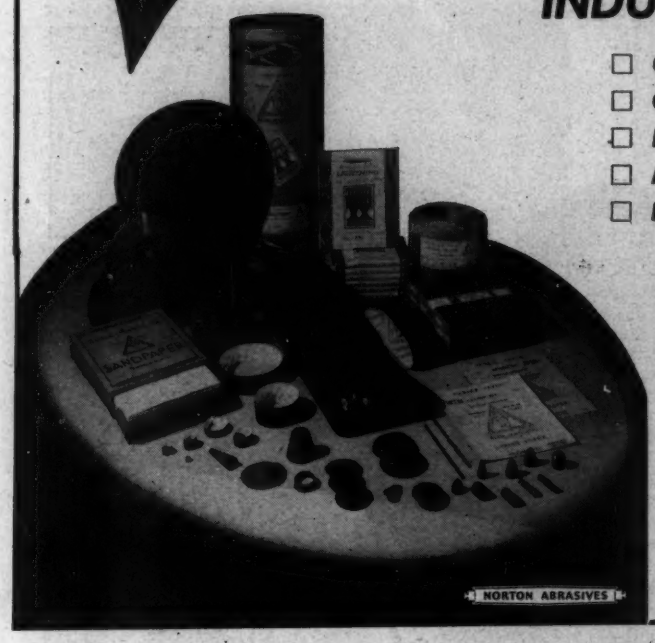

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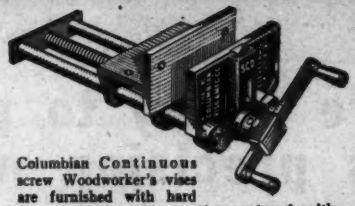

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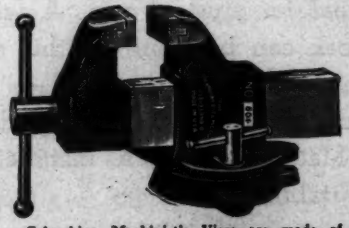

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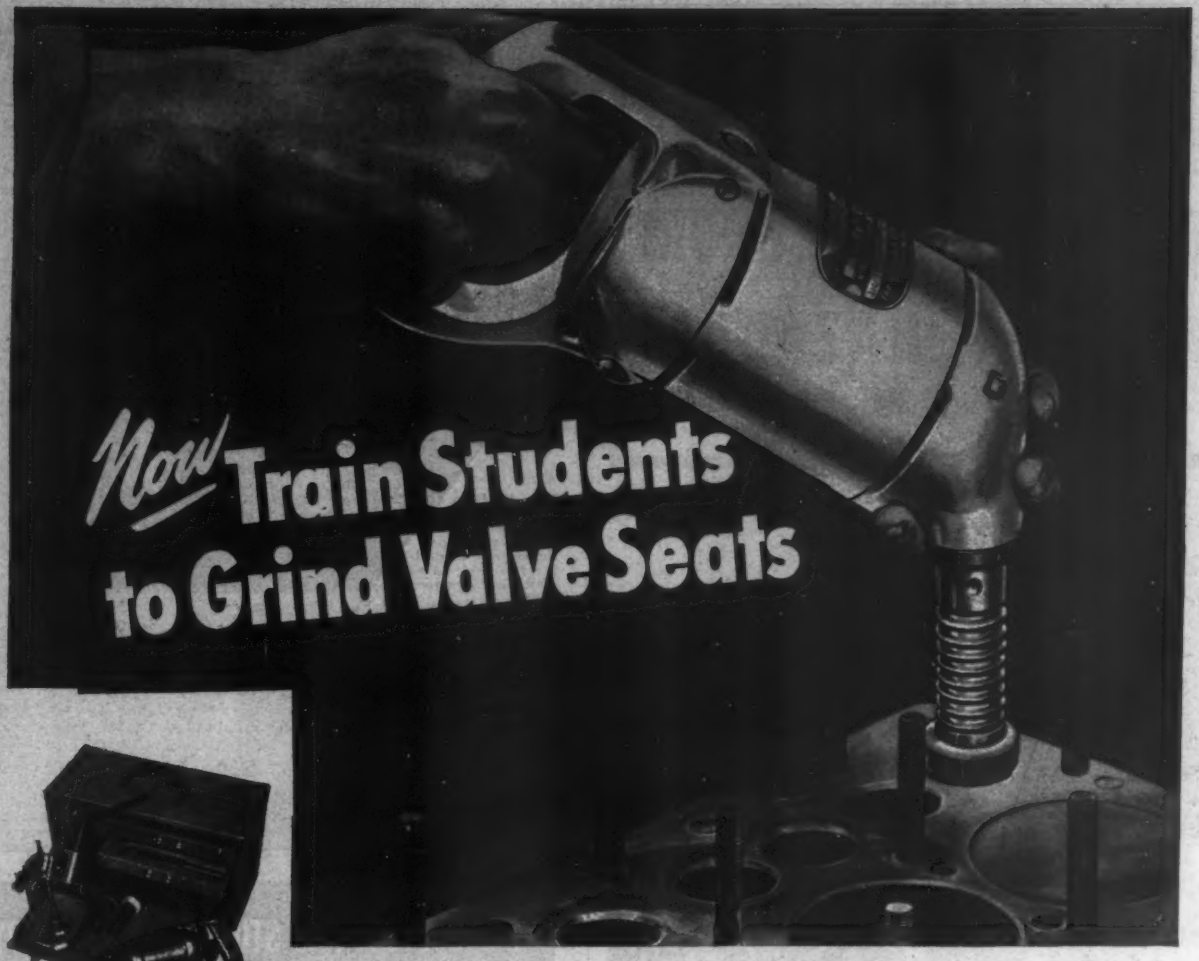

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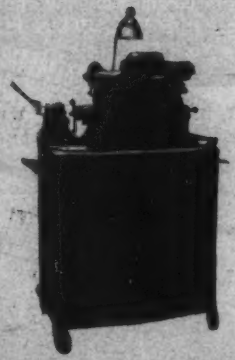

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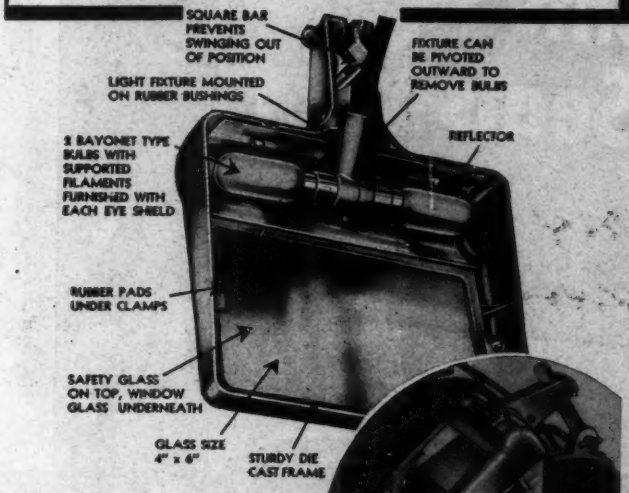
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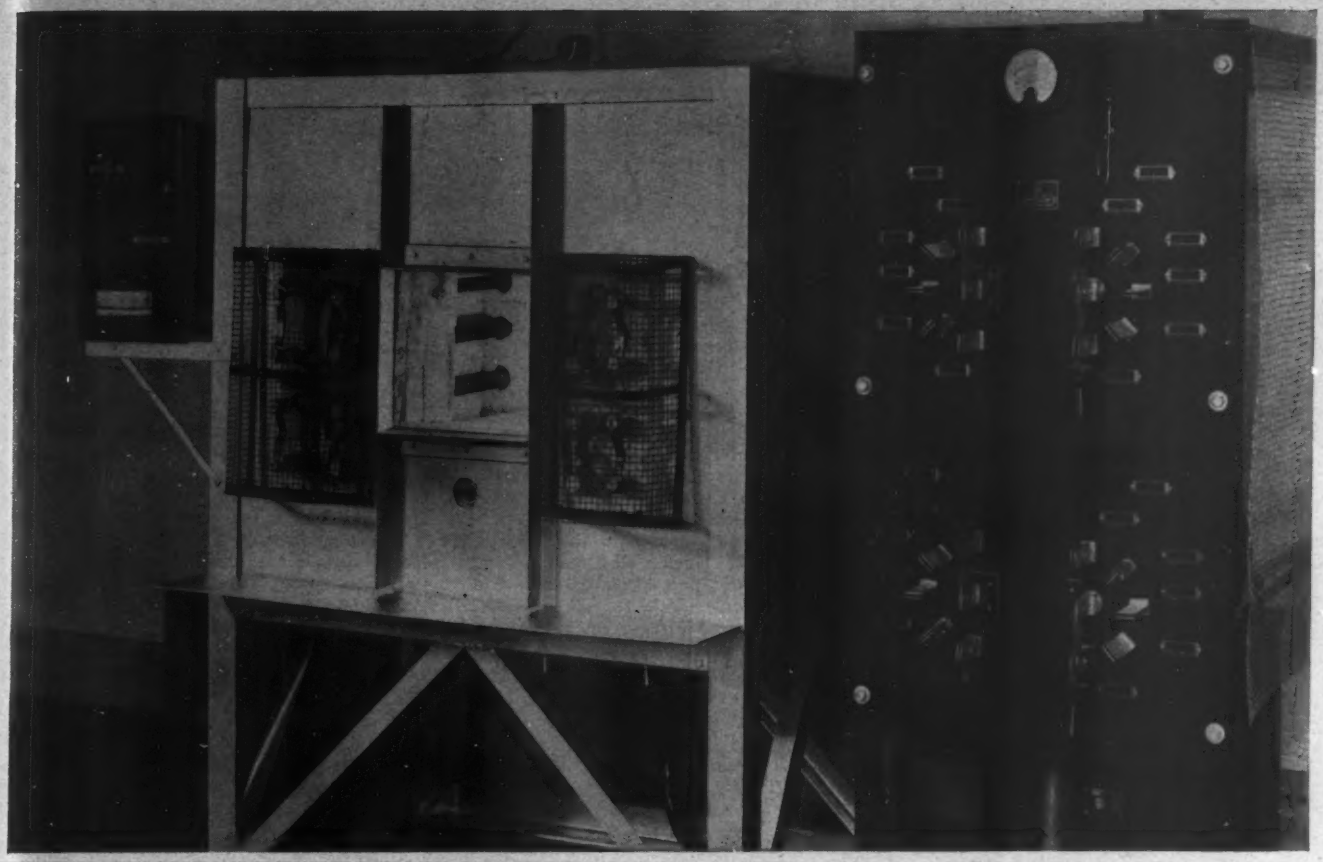

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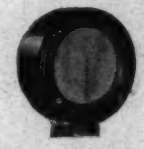

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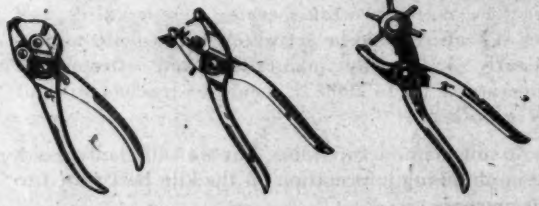

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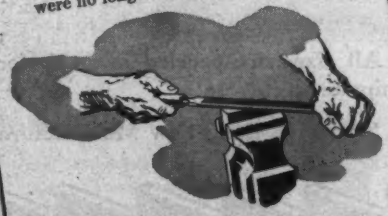

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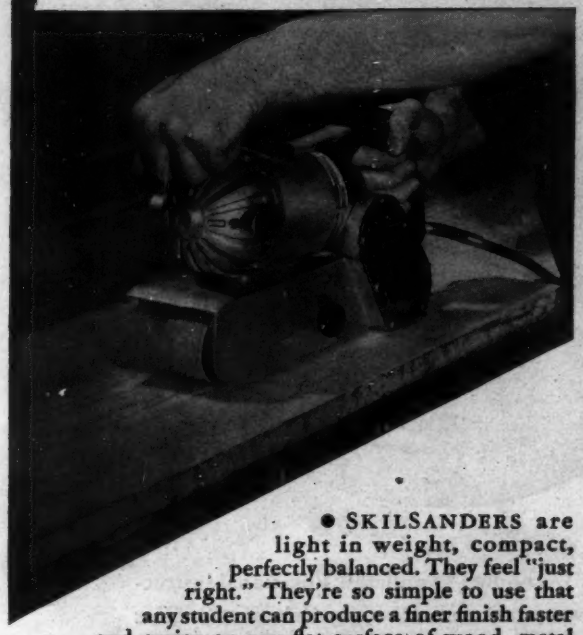

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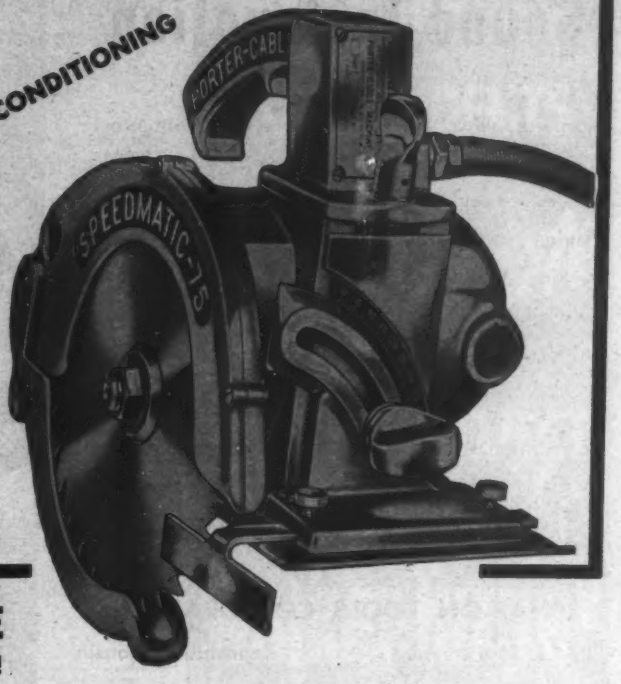

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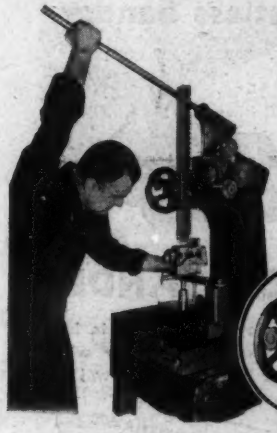

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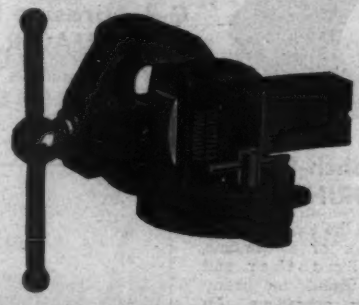

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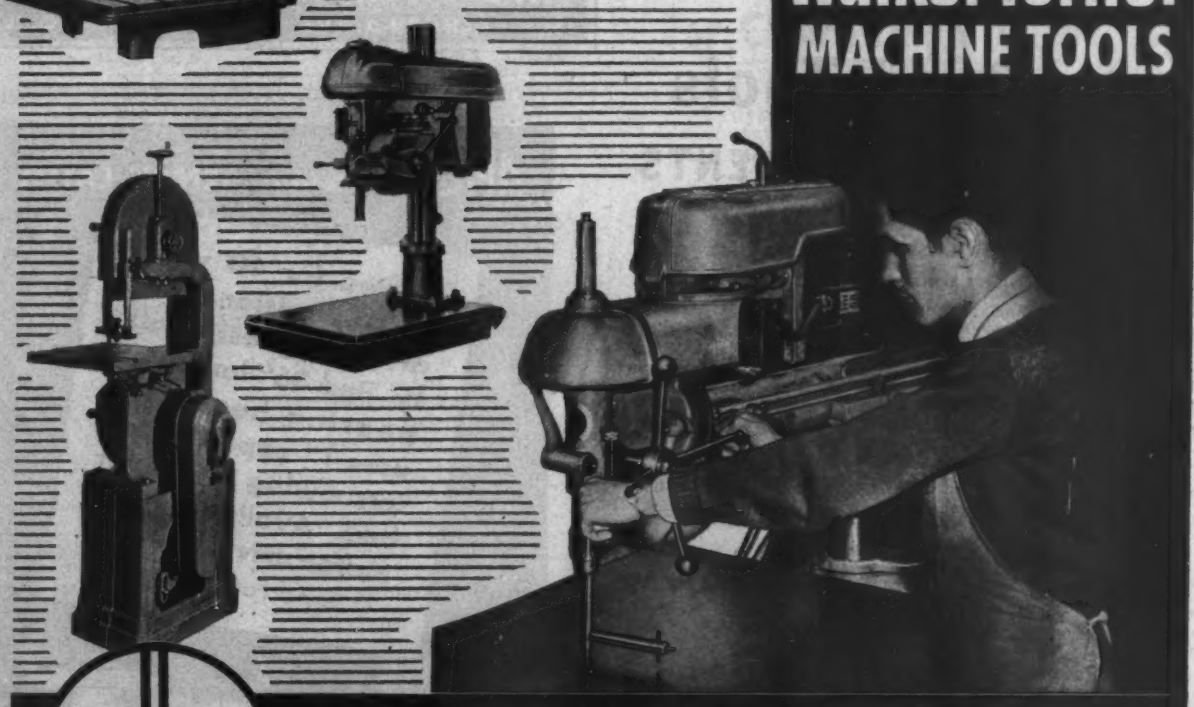

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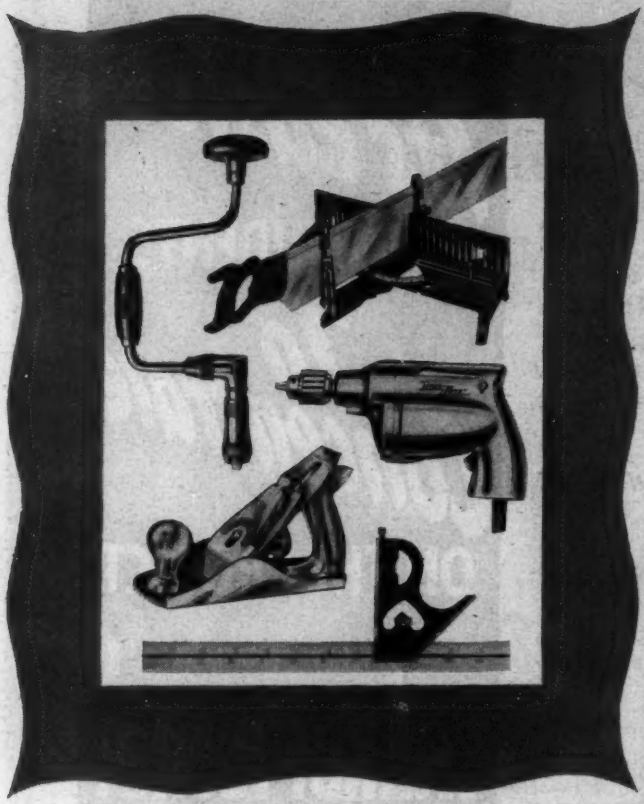

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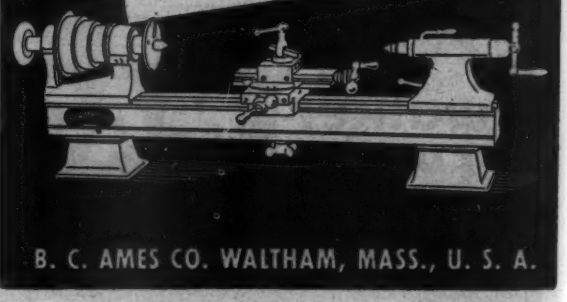

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STANLEY-CARTER ROUTER SHAPER

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The exclusive threaded motor housing of this Router provides quick, accurate control of depth when routing. One complete turn of the ring on the motor housing raises or lowers the motor 1/16 inch in the base.

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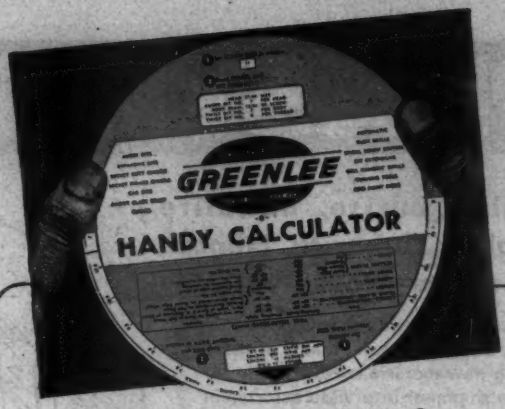

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Solves problems *fast*. Set the dial and it converts linear to board feet . . . determines slope per foot in degrees . . . compares hardness, weights, shrinkage, warping, workability of various woods.

Gives bit sizes for head, body, thread of screws . . . nail specifications . . . tool sharpening tips. 6" in diameter . . . heavy varnished cardboard. *Special* war-time offer by makers of famous GREENLEE high-quality tools.

Send 10c today (not stamps) with your name and address to Greenlee Tool Co., Division of Greenlee Bros. & Co., 2030 Twelfth Street, Rockford, Ill., U.S.A.

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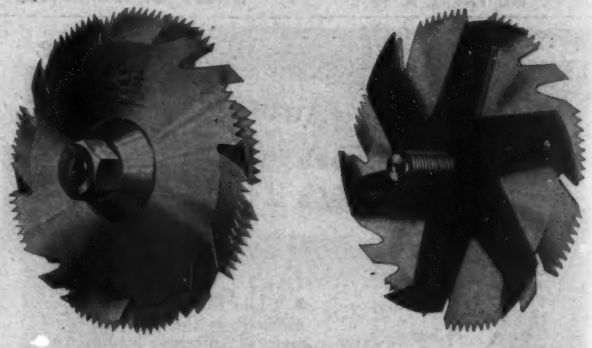

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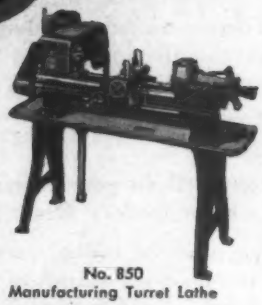
Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES

ACCURATE work comes from Logan Lathes because accurate work goes into building them. Typical of maximum tolerances allowed are the following: Bed ways are within .0005" of absolute parallelism. The bearing faces in Logan headstocks are held to an accuracy of .0005". The front bearing seat on the Logan Lathe spindle can vary no more than .0002". The only way to hold tolerances as close as these in lathe after lathe is to maintain a highly organized, rigid inspection system.

That is why one of every seven men building Logan Lathes is an inspector, skilled in the use of precision instruments such as Comparators, Johannson Blocks, Sine Bars, and the most accurate of gauges. Using this precision equipment, Logan inspectors check every operation involved in building the lathe, individual parts, sub-assemblies, and completed machines. They make certain, in short, that every Logan Lathe will work accurately because every part of that lathe fits accurately. True, this Logan stress on inspection represents a large investment, both in fine equipment and skilled personnel. But it is also the wisest economy. The lathes which pass such rigid inspection make friends of the men who use them. Ask your Logan Lathe dealer, or write, for full information on all models of Logan Lathes.



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SPECIFICATIONS common to all Logan Lathes: Swing over bed, 10½"; Bed width across ways, 6-15/16"; Bed length, 43⅛"; Size of hole through spindle, 25/32"; Spindle nose diameter and threads per inch, 1½"—8; 12 Spindle speeds . . 30 to 1450 r.p.m.; Size of motor . . ⅓ or ½ h.p., 1750 r.p.m.; Preloaded precision ball bearing spindle mounting; Drum type reversing motor switch and cord; Precision ground ways, 2 prismatic "V" ways, and 2 flat ways.

LOGAN ENGINEERING CO.
CHICAGO 30, ILLINOIS

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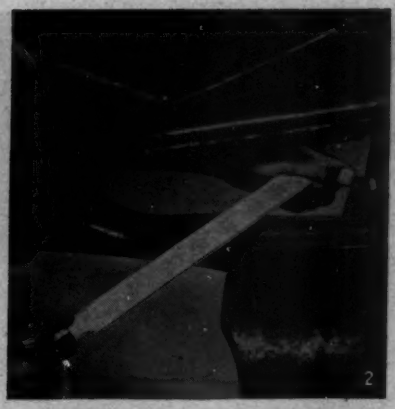
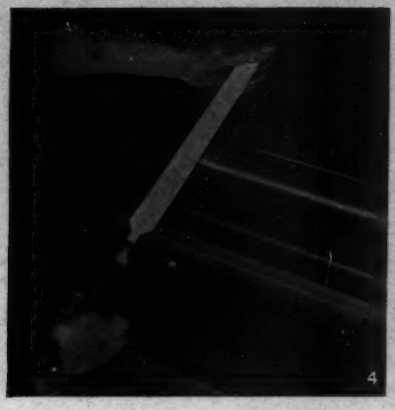
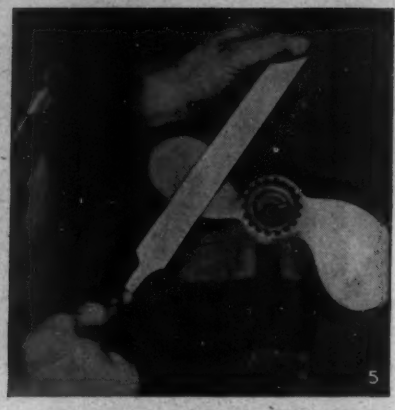


WHICH IS "THE RIGHT FILE FOR THE JOB"?





SPECIALIZATION — in tools as well as in occupations — rules industrial practices today. For the countless operations involving filing, Nicholson has gone far to aid metalworkers—with specialized files definitely proved to turn out work faster, more efficiently and more economically.

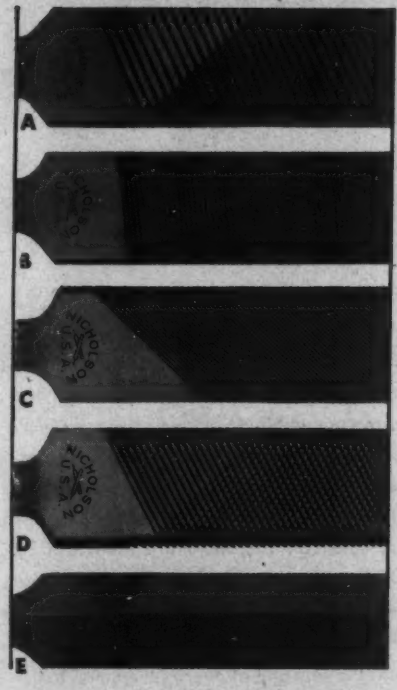
How well do your classes know modern files?

On this page, for example, are five fairly common yet distinctive filing operations . . . and five equally distinctive types of files to fit those operations *properly*. An interesting test would be to see how many of your students can name or associate the right file for each of the operations, namely:

1. Precision finishing a small cam wheel. **2.** "Snagging" a foundry casting. **3.** Finishing a brass valve part. **4.** Lathe filing. **5.** Dressing an aluminum propeller blade. The answers are:

1-E. Nicholson XF. Swiss Pattern Slitting File. **2-D.** Nicholson Foundry File (with extra-sturdy teeth). **3-B.** Nicholson Brass File (note fine long-angle overcut to break up flings and help file clear itself). **4-C.** Nicholson Long Angle Lathe File (provides clean-shearing, self-clearing, non-chatter action). **5-A.** Nicholson Type A Aluminum File with deep "open-throat" upcut and fine overcut.

"The right file for the job" is a long-standing Nicholson tradition, achieved through relentless study of industrial filing problems and advancements in production methods.



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This Issue

The present issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION has been devoted to "Projects." It is hoped that the following offerings will be found helpful.

For the *woodworking* teacher there are: A Turned Wood Trinket Box, Animal Glue News Notes, Practical Woodwork "Seesaw" Test, A Quaint Glass Shelf, An Amusing Hat Rack, Whittling-Jackknife Technique, and a Picture Frame.

For the teacher of *metalworking:* Gettysburg Cannon, A Micrometer Reading Device, Building and Operating a Small Aluminum Melting Furnace, Ornamental Tin Craft, and Visual Aids for the School Machine Shop.

For the *print shop* teacher: Block-Out Stencil Method, Copyholder for the School Print Shop, a Mural Map Showing Relation of Printing to Other Industries, and two excellent page cuts on Design for the Teacher of Industrial Arts.

For the teacher of *drawing:* A Handy Projection Box, and Drawing in the American Way of Life.

For the teacher of *electricity:* Fluorescent-Lamp-Unit Tester.

Then there is an excellent article on Horizontal Lap Units for Gem Cutting, and a full page instruction sheet on An Indian Headdress.

For Your Information

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This Month's Cover

The cover picture chosen for the October number of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows A. C. Goodrich, instructor in the auto-mechanics shop at the West Allis School of Vocational and Adult Education, West Allis, Wis., demonstrating the fact that the lifting jack can do much more than merely lift.

Photograph, courtesy of Blackhawk Mfg. Co., Milwaukee 1, Wis.

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Industrial Arts and Vocational Education

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

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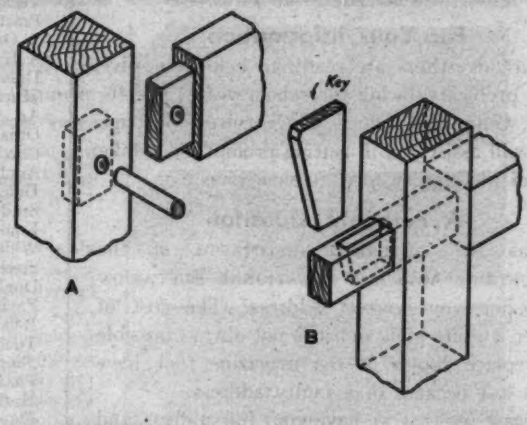

MORTISE-AND-TENON JOINT

The pinned mortise-and-tenon joint (A) is the same as the blind mortise-and-tenon joint except that it is strengthened by a square peg or an ordinary dowel as shown. The keyed mortise-and-tenon joint (B) differs from most joints in that it is not glued or nailed, but instead is held together by the wedging action of the key. It is used mostly in "knock-down" construction and for heavy, ornamental pieces.

YATES-AMERICAN

What of the Men Who Fought?

*Dr. Thomas A. Hippaka**

Although our major responsibility in industrial education is to acquaint people with the industrial world and to teach them to make a living in it, we should be vitally concerned about other life values as well.

While a man's job is always of primary importance, and we must never lose sight of that fact; nevertheless, "Not by bread alone shall man live."[1] It is at least as important for him to learn to live a life as it is for him to earn a living; for him to interpret and to acknowledge principles and skills in the light of our existing social and economic order, and to be a good citizen; for the very life of a democracy depends upon good citizenship. Furthermore, ne need to be concerned about world citizenship as well, because world peace cannot be assured without it. Constantly, as teachers we need to remember this, and as we earnestly strive to make a better workman we must also help him to live a full life. We must see him not only as a worker, but as a many-sided individual who has a well-developed social, emotional, intellectual, physical, and religious make-up. Eventually, we must hope to make of him a well-integrated personality, one who is happy and usefully productive in his work, his home, and his community. In addition to this, America and the world will demand of all of us much of the spirit of Thomas Payne which prompted him to write these stirring lines, "If there be trouble let it be in my day so my child may have peace."

Our sense of values is going to have to change. Leadership everywhere, especially in education, must develop a sane, well-balanced sense of values if such leadership is to prove of maximum assistance to our students, whether they are returning servicemen, civilian adults, or young people enrolled in colleges, vocational schools, or our secondary schools. Strangely enough, the very men who happen to be our chief concern at the present time are giving us very valuable assistance in this direction if we will but listen to them. The men, who, up to a short while ago, were fighting our battles, are very definitely putting some priorities into our sense of values which cannot be denied during these history-making days. Let us examine some of these, for they come to us out of the fiery crucible of war, and surely values that can withstand such a test, must be given priority, especially by those of us who remained at home.

*Professor and Head of Industrial Education, Iowa State College, Ames, Iowa.

[1]Matthew 1:4.

Home

Home has come first on the serviceman's list of priorities. There is nothing unusual about the love that these men have for their homes, for their foxholes and caves have been a far cry from home. Strange as it may seem, their greatest fear was not the fear of death. On the contrary, their primary concern was that they might not again see the old home which may be an American farm, or the neatly kept bungalow in a midwestern town, or even a tenement flat in a teaming metropolitan area. To them, all of these places spell home. Especially when the going has been tough and hazardous, their minds have wandered back home for strength, courage, and fortitude to fight on regardless of the odds.

Perrault, a slogging infantryman in France has written: "When I get home I would like to find living conditions unchanged; the same shrubs and trees and lawns in front of the houses. That's where I want again to dig in the soil of a free America and plant my flowers."

In the face of an ever increasing divorce rate, and no nation can survive too many broken homes, these men are impressing upon us the importance of happy home life. Dr. Walter Buerger, a naval officer who suddenly lost his young bride through poliomyelitis, was surely thinking of home when he sent the writer this beautiful and significant quotation from the pen of Kahlil Gibrans:

> "You were born together, and together
> you shall be forevermore,
> You shall be together when the white
> wings of death scatter your days,
> Aye, you shall be together, even in
> the silent memory of God."

We on the Home Front

Naturally as these men have thought of home they have been vitally concerned about what has happened to us on the home front. They want to know if we are still sound in our thinking, honest in our actions, and attached to all that is good. Are we still strong of character? They like to feel that they can come home to real people and they richly deserve this right, for did not we expect life itself from them, as they fought our battles? Let us examine this situation further to see what is too often the true state of affairs.

In too many instances returning servicemen have experienced shocking disappointment with our civilian population. Instead of appreciation for those who have sacrificed everything in this war they have found indifference in some cases. To their utter amazement our fighting men have discovered that too many of the folks back home have deteriorated not only physically, but mentally and morally as well. It is to be expected that war sends men home wounded in mind and body, but to find men and women who have lived in comfort and security, hundreds of miles from the hideousness of war, squandering themselves in harmful dissipation, is quite another matter. Naturally our fighters are skeptical about the strength and ability of such people to successfully cope with the complexity of postwar problems. They realize all too well that God is giving us another opportunity to establish world peace, and that the world may never have a third chance.

Not only are our war veterans seriously concerned about our indifference toward the human sacrifices which were made by the cream of our youth in this conflict, but they are equally concerned about our apathy and unresponsiveness regarding the postwar future. They would obviously like to see us much more alarmed over major domestic and world problems, and less concerned about mere incidentals in our daily living. Is it any wonder then, that to them we often appear complacent, self-seeking, and even hopelessly superficial? Naturally, they are deeply disappointed in finding us so inadequately informed on general world conditions. These men feel that we have a foreign policy based upon expediency, while in the final analysis our foreign policy should be influenced by the intelligence, interest, and demands of us all. We are busy indicting others of their sins of commission, while we ourselves may be mired in our own sins of omission. Public opinion, when sufficiently aroused, will accomplish most anything; but we need to have interest and drive enough to discover what the real issues are, and to make it the personal business of everyone to insist that these issues be settled with vigor, forthright integrity, and justice.

While Wendell Wilson, another slogging infantryman, may be deeply disappointed when he arrives in our midst, nevertheless, he laid down a worthy pattern of action for us when he wrote these words: "I want to find man and woman close to the truth, not changed into universal weaklings by unusual power or wartime prosperity. I want thereby to keep faith in mankind unchanged."

World Collaboration

Our fighting men exhibit grave concern regarding world collaboration leading to world brotherhood and ultimate world peace. They do not want a third world conflagration, and they have very definite ideas as to how it can be prevented. Here is what an unknown American soldier wrote his father from the Siegfried Line in Germany: "If my generation can destroy the 'middle of the road' nonsense of your generation, which, in practice, only results in one neighbor standing on his front porch and watching another have his home robbed, while some other robber steals in his own back door and robs him, after which they decide to co-operate, only until the robbers are beaten off; and if we can pass on to our posterity at least the groundwork of international collaboration in maintaining world peace, and in guaranteeing all good peoples a right to benefit thereby; we shall have kept the faith."

Continuing his letter, he wrote his father: "Let no one think that the statement, 'We are dying today that the way of life in America might live,' is complete. By itself, it is a noble thought. But I fear the conscience of your generation must add to it, 'For there was a time when America could have lived without more spilling of blood, but we, in whose hands that destiny was placed, failed to rise to the peace in the world! We allowed ourselves to fall back into a soft way of life, which condoned, nay solicited, the accumulation of comfort, easy morals, and greed. We shut and locked our minds against sacrifice, little thinking and little caring that by so doing, one day those we brought into the world of our own volition must pay the supreme sacrifice for our sins."

Distinctly contrary to the belief of too many, these men are more certain than ever that every nation on the face of this earth has its particular kind of greatness and that we must exchange greatness with one another; that we cannot expect to sell all of the time, and that we must buy as well — a two-way proposition, if you please. Bitter battle experience has driven home the lesson of world collaboration. They feel that just as soon as it is humanly possible, we must have a community of nations where we will agree on the greater essentials and still make the world safe for differences, thereby enjoying the good will of each other.

Many a soldier has seen this inscription on the statue of Liberty in New York harbor:

"Give me your tired, your poor,
Your huddled masses yearning to breathe free,
The wretched refuse of your teeming shore.
Send these, the homeless, the tempest tossed, to me:
I lift my lamp beside the golden door."

Even to us who came to America as immigrants early in the present century, and to whom this world's most beautiful latchstring really hung out, it is known that such an invitation now has its limitations.

What our men are saying is this: "If we no longer can take in 'the tired, the poor, the huddled masses and the wretched refuse' on any extensive scale, let us do our part in taking Christianity, freedom, and opportunity to them wherever they may be, thereby securing peace for ourselves through world collaboration by having assured it to others much less fortunate than we."

This they have done, eleven million strong.

The men who fought are telling us that the future of the world can be the darkest or the brightest, just as we choose to make it. If we are willing to harness our miraculous technology, including the power of our atomic bomb, to useful and human purposes, we are standing on the threshold of the very best era that the world has ever known. If World War II has not taught us that everlasting peace will come only through the brotherhood of man, then a third world conflagration is already in the making, and World War III means the destruction of our civilization. Power is given to men and nations only in trust, and never was that as true as it is today. Ours is the new responsibility for peace and justice in a world where we must stand or fall together.

America

As the perspective of our men has widened and their horizons deepened, they have not forgotten America. If we will but listen to them, they are teaching us appreciation and love of country, all of which still needs to be taught in America.

Sergeant Skidmore, serving on a distant island in the Pacific, sent us this reminder: "Out here, we have come to know America. We have learned the love a man can have for his homeland: It is an unexpected love for us to have, for we were almost disinherited. In our day we have booed the display of the flag, hooted the President, laughed at Congress, scorned a country that had no place for us, and then we have fought for all those things, and some of us have died for them. Things that meant nothing to us before are valuable now, for they have been threatened and we have secured them.

"We will be back sometime. We could throw ourselves on the earth of America, onto her soil, trying to hug her the way we are going to hug you, with the knowledge that it will never be enough, that never in our lives will our arms be strong enough and great enough to express what is in our minds and our hearts.

"Yes, we are coming home, and this is love, human and plentiful, that we bring you. This is what we have been writing you about. Something is coming with us, something that will fit easily into the blue suit with the pin stripe and the white shirt — the shirt will be loose around the neck, but we will catch up with it — something that will fit readily into the good feeling of being at home; but when we go out the door we want something else to fit, too. And before it fits it will have to contain tolerance and charity and kindness, honesty and mobility; odd words for us. These qualities we have gained."

There is something very practical about the love of country that these men are bringing back to us. They have no time for foolish, pacifistic idealism. Practice kindness, yes, where people are worthy of it, and where they will appreciate it. They intend to back up their way of life by being adequately prepared for any emergency, and if reason is not to be respected, then that respect will have to come through force of arms. And adequate arms they intend to have. We are hopeful that a substantial number of our men will remain in the armed forces of our country who will make her defense their life's work. These men realize, too, that defense is by no means a matter of military preparedness alone. They feel that we need to be internally strong and that we need a diplomatic corps that can adequately cope with foreign problems.

What our men are telling us is that democracy is never a gift, and surely they would agree with Daniel Webster who once said, "God grants liberty only to those who live it and are always ready to guard or defend it."

Postwar Employment

Postwar employment is of primary concern to our men in the armed forces. Constantly they are driving home to us the importance of work opportunities for all. Many of them left good jobs, while others have not had an opportunity to enjoy any type of work experience. They have not forgotten the uncertain years in the thirties when from six to twelve million workers were idle. Leaf raking, selling pencils, and standing in bread lines must never return. On the other hand, they realize that it is not going to be easy to provide employment for everyone, since an estimated ten million are to be discharged from our armed forces, and a minimum of fifteen million from our war industries. The postwar economy that we are capable of creating can put fifty-five million men to work who will produce a minimum annual income of one hundred and forty billion dollars.

Labor, industry, agriculture, and our government must really become partners in production. Private industry and agriculture must be given every opportunity to provide essential employment. We will need an economy where a premium is still placed upon private initiative and enterprise, intelligently regulated and supplemented whenever and wherever necessary, by our government.

The veteran's employment possibilities boil down to some very interesting and far-reaching basic considerations. Order must prevail and any semblance of chaos or confusion regarding his future employment must be eliminated.

Let us examine briefly some of the signposts leading to the soldier's return to satisfactory and useful employment:

I. The Selective Service Act of 1940 and the G.I. Bill of Rights of 1944, coupled with the army's care and solicitude for the soldier headed home, add up to an imposing list of protections and safeguards for the serviceman.

A. Our government restores him to the best possible physical and emotional condition before it lets him go.

B. The G.I. Bill of Rights provides him with unemployment benefits, placement service, educational assistance, home loans, and loans on business.

II. It is gratifying to note the healthy and charitable attitude that a number of labor unions are taking toward the returning servicemen. Many unions have passed legislation that will give the veterans free initiation as journeymen where they exhibit evidence of skill and experience gained from training and work in the armed forces. Very often these men will be superior to war plant workers who are now receiving journeymen's pay. In many instances the veteran will have had more thorough specialized training and broader experience.

III. The Selective Service Act, in so far as it is possible, promises to return the veteran to his former job.

A. Some men can do better by themselves than their former jobs will permit them to do. Therefore they do not wish to return to the old jobs.

B. Others cannot have them back because the war has incapacitated them to such an extent that they no longer can do the work.

C. Some were so young when they joined the services that they did not have jobs in the first place.

D. A very large number of the old jobs do not exist any more and will not come to life even after their former claimants return.

E. There will be instances where the veteran can have his job back by putting another man out of work, thereby creating a new chain of difficulties and displacements.

The Physically Wounded

Let us look at the men who have been physically wounded in World War II. This number will total many times the number who sustained permanent physical handicaps in World War I. It is literally true that many of the hardest battles of this war have been fought in hospital beds. According to Major General Norman T. Kirk, Surgeon General of the United States Army, 97 per cent of our fighters have very definitely won these battles. Although they are coming back wounded and often permanently disfigured, they are generally in a healthy frame of mind.

Captain Ted Lawson, who helped Doolittle bomb Tokyo on April 18, 1942, and who later watched a buddy of his saw off his right leg, finally got home to his wife after he had been flown, shipped, and carried around the world. Already on his return trip to America he was anxious to see if he would be able to overcome his handicaps, and of this journey he wrote:

"When everybody was asleep on the Stratoliner the night we flew the South Atlantic from Africa to South America, I made my way up the aisle on my crutches and stood behind Niswander, the big plane's pilot. The copilot, Kratovil, was away from his seat. Niswander motioned to it, and, after a little trouble, I got into the seat and leaned back, looking at the stars in the black sky.

"He was a nice guy, that Niswander. He could read my thoughts, I guess, for I was just thinking how much I wanted to feel the ship's controls in my hands when he said, 'I know how you feel. Take it for a while.' He took it off the automatic pilot.

"I flew the Stratoliner for an hour. It helped. I had been curious to see if flying bothered me mentally."

Whether or not these men will remain in a healthy state of mind will depend a great deal upon our attitude toward them. Even with their physical handicaps they are not looking for a lot of sympathy. What they really want is a chance to work, to be self-supporting, and self-reliant, and to be treated like normal human heings. Nor do they want their physical handicaps thrown at them constantly as they seek employment. Major General Kirk has found that when these men are properly trained, many of them have a higher earning power than when they first joined the armed forces.

The Mentally Wounded

Quoting statistics from a survey made of the First Army during the two months immediately following D Day in France, Dr. Eli Ginsberg, Chief of the Resources Analysis Division of the Surgeon General's Department reports that "for every four medical cases and every nine battle wounded cases, there were two psychiatric cases."

Our Army gives us some vital figures regarding the mentally wounded. According to a recent report of the Army, 90 per cent of our overseas neuropsychiatric cases were sent back to duty, and 65 per cent of them were able to return to combat units. Approximately 10 per cent of these men were brought back to the United States for treatment. However, there were more neuropsychiatric than medical cases returned from the Pacific war area between January 1, 1945 and June 30, 1945.

Let us listen to these men as they speak to us in the first person:

"They called it 'shellshock' in World War I; in this one the milder term 'combat fatigue' constitutes the connotation descriptive of our condition. We who have 'shot our wad' merely say that we have 'blown our wigs' or 'flipped our lids.' Yes, we are the fighters who could not take it, and we cracked up. Nobody in this world of ours has yet invented a way to fight a war without fear. We broke under the fear and the unbearable stresses and strains of the world's most hideous conflict which could only be fought to a successful conclusion with the speed, power, and maneuverability of the most fiendish war machines ever created by man.

"There were other contributing factors which accentuated our condition. In many instances the unselectiveness of the selective service may have started us on the road to disaster. Many of us were already misfits when we were drafted, and the tough going in the armed forces was too much for us. Too often one has to be bandaged up before his difficulties are taken seriously. Mental wounds cannot be bandaged. While our medical staff did everything humanly possible to alleviate our condition effective psychiatry may have come to our rescue too late. It could well have been another case of 'too little and too late.'

"Whatever the causes and the contributing factors, the stark truth is that many of us will be the 'cases' coming out of this war. Even the worst of the physical wounds are being marvelously cared for by modern medical science and the intelligent, indefatigable efforts of our surgeons. Many of us who are mentally 'cracked up' will of necessity have to be isolated, and in order to do this you are having to expand your hospital facilities on a hitherto unprecedented scale. We may never go back to work or to school. We may never marry, build homes, enjoy leisure, have children, and participate in the host of worth-while and satisfying activities indulged in by normal people. Our future welfare, and it is anything but bright, depends totally upon you. Be good to us; try to understand us and provide for our limited happiness. After all, we got this way so that you could go on living your way in a free America and a free world."

Are All of the Physically and Mentally Wounded Just So Many Cases?

Although it is a tough pull for these men, they refuse to be classified as "just so many cases." Hopeless as many of them may appear to us, we must never lose sight of this fundamental faith, that "while there is life, there is hope." If training and jobs were ever made to fit human needs, interests, abilities, and capacities, that must be done with these men. They are not guinea pigs to be experimented upon by theorists who use high-sounding terms which mean very little. Useful work, accompanied by reasonable pay, constitutes a great cure. Each man should be given every conceivable opportunity to do something, menial as that may be. If finger tips were ever the outlets for men's emotions, they should be made to serve that purpose now.

Dan Carney, a marine, said most of this to a medic in these few well-chosen words as he laid down his mallet at the end of a work period, "I sure hammered a lot of hell out of myself today, Doc. Finished thirty-five parts — two more than yesterday. Boy! Do I feel good!"[2]

Dan was well on his way to total recovery because someone had hope, faith, patience, and intelligence.

Education

To thousands of our men an opportunity

[2]Collier's, January 13, 1945.

to continue their education is as important as a job. It is conservatively estimated that 10 per cent of the men in our armed forces will return to the educational pursuits which they left in order to defend their country. The type of training to which they have been subjected in the service has been gotten the hard way, in concentrated doses, and under the stress and strain of war. The prime motivator has been a chance to continue living when under fire if the lessons have been adequately learned. They want no more of education that has been predigested and is unworthy of assimilation. Educators will have to decide whether or not a man is to get credit for something because he knows the subject, or can do the job, regardless of how or where he gained this proficiency. Veterans do not wish to be treated as so many oddities, separate and apart from the rest of the student body. They very definitely wish to be an integral part of the school, and to be considered as such at the earliest possible moment. They will want help, yes, but without fanfare or ballyhoo, and the help will want to come from teachers who know something about life, and even war, if you please. They will expect, and they have a right to expect, from every staff member cordiality, understanding, and personalization.

Under the "G.I. Bill" Congress has planned and provided most liberally for the further education of our returning veterans, both men and women. In order that we may be of maximum assistance to those who return to our colleges from World War II, and that the veterans may take full advantage of the provisions in the bill, we need to take careful cognizance of the following points:

I. All veterans interested in attending an approved college should contact the registrar of that college.

II. Veterans may enroll in refresher courses, special courses, the usual undergraduate college courses, or graduate courses.

III. The serviceman's educational activities must be started not later than two years after either the date of the veteran's discharge, or the end of World War II, whichever occurs the latest. No training or education shall be given later than seven years after the termination of World War II.

IV. Any veteran who was 25 years of age or over when he was inducted into the armed forces is entitled to one year of educational training. Furthermore, if he can prove that his education was interrupted he may be eligible for additional training.

V. Veterans without dependents are entitled to an allowance of $50 per month, and $75 each month if they have one or more dependents.

VI. A yearly amount, not in excess of $500 is allowed for tuition, books, and supplies, and is paid from federal funds.

VII. Any veteran not over 25 years of age at the time of his entry into active duty is entitled to one year of training for the first 90 days spent in the armed forces, and an additional period of education equal to the total time of his active service after September 16, 1940, and before the termination of World War II.

VIII. Under the "G.I. Bill" any veteran of World War II, man or woman, is entitled to receive training or education in any approved training or educational institution if he or she has served in our military forces on or after September 16, 1940, and prior to the termination of World War II; has been honorably discharged; has served a minimum of 90 days, not including time spent in specialized training, such as cadet or midshipman training programs.

IX. Disabled veterans, for whose disability there is a pension, are entitled to training up to four years if they served after September 16, 1940, during World War II, and were honorably discharged. In addition to books and tuition not to exceed $500 per year, a married man receives $103.50 a month, while a single man draws $92 for the same period of time.

Religion

Out of this war men are bringing back to us a religion that is very real to them, and they have learned that a man without a functional religious philosophy has very little sense of security. In concentration camps, hospital wards, prisons, briefing rooms, foxholes, caves, in deserts, and on barren beaches, men have found God. They are coming back to us, and they are very definitely challenging our churches.

Chaplain Stroup has warned us of this challenge when he issued this ultimatum, "If chaplains in the army have been able to overcome the deadly indifference of the soldier, it is only because they have brought to them a religion that serves their present need and fulfills their future hopes. But our hold upon these men is tenuous. One day they are coming home. They will need the Church and the Church will need them; but it must be a revitalized Church. They, and all men will be seeking leadership in the rebuilding of a wrecked society; that leadership must come from a Church which has given evidence by its own reformation that it is worthy to direct the reformation of mankind."

Our men have become very impatient with the denominational conventions in which they were compelled to grow up and live.

Reverend Daniel A. Poling wrote from the Pacific, "Out here, religion does not follow established patterns. Ministers, priests and rabbis preach from the same altars. There is great unity of purpose. Whatever differences there may be at home, the churches must maintain the spirit of this unity. I believe this unity can be continued without sacrificing a single worthy loyalty. But that's a job for the home church. It will be a tragedy for the churches if 11 or 12 million returning men fail to find the equivalent of what they found out here."

Freedom and Democracy

Through self-sacrifice our fighting men have placed a priority upon freedom. A boy frightfully mangled and dying on a stretcher at Anzio had only one concern. In order that he might die with faith in us who were to continue having our freedom because of the supreme sacrifice that he was about to make, he quietly whispered these words:

"I don't mind this if before I die, I can have some assurance that my going is not in vain. Tell this to the folks back home."

In death our fighting men have personified the purest democracy on earth, and have forever established a priority upon it.

When the fifth Marine Division Cemetery was dedicated on bloody, windswept Iwo Jima, Chaplain Roland Gittelsohn fittingly expressed in these words what those who had died there had said so unforgettably through self-sacrifice:

"Somewhere in this plot of ground there may lie the man who could have discovered the cure for cancer. Under one of these Christian crosses, or beneath a Jewish star of David, there may rest now a man who was destined to be a great prophet. . . . Now they lie here silently in this sacred soil, and we gather to consecrate this earth to their memory. . . .

"Here lie officers and men, Negroes and whites, rich men and poor. . . . Here are Protestants, Catholics and Jews. . . . Here no man prefers another because of his faith or despises him because of his color. Here there are no quotas of how many from each group are admitted or allowed. Theirs is the highest and purest democracy.

"Any man among us, the living, who . . . lifts his hand in hate against a brother, or thinks himself superior to those who happen to be in the minority, makes of this ceremony and of the bloody sacrifice it commemorates, an empty, hollow, mockery. . . ."

WHEN IN DOUBT — ASK

Leonard E. Schmidt*

Before you turn that key too tight,
Or pull that wrench too hard,
Be sure you know, just how far to go,
Or it may be too late to retard.
There is only one way — the right way,
To do each and every task,
So if you're not sure, remember this,
When in doubt — ask.
How much better off we all would be,
In the new things that we try,
If we'd only go to the ones who know,
For advice on the "how" and "why."
And if you should ask them how they learned,
I'm sure they wouldn't mask
The fact that whenever they were in doubt
They always remembered to ask.

How little do my countrymen know what precious blessings they are in possession of and which no other people on earth enjoy.
—Thomas Jefferson.

*Lincoln Hall Vocational Shops, Lincolndale, N. Y.

A Follow-Up Study of 251 Graduates

*Lester V. Hill**

The business of educating the mass is one of the most fascinating of all enterprises. Such great strides in the advancement of educational policies, philosophies, and methods have been achieved that if one reflects he is amazed at the progress. Yet, on the other hand, progress in mass education has been relatively slow in comparison with progress in other fields of human endeavor. This fact has been more forcefully revealed under wartime conditions. Immediately the questions arise: (1) How shall we proceed to effect those changes necessary for adequate educational programs? (2) To what extent is our present program inadequate? or (3) To what extent does our school program satisfy the needs of the community?

In industry it is now possible to measure a finished product accurately to within the limits of a millionth of an inch. In many other fields of endeavor products and production can be safely measured and recorded with a great deal of fineness. But in the field of education where the product is human personality, no such measurements have yet been devised or attained. Until such time when more refined measurements are advanced, educational measurements will continue to be more or less indirect and somewhat lacking in fineness.

The education of the youth is so vital to the community that its effectiveness should be determined whenever possible. Too little interest has been shown by educators in the product of their labor. More efforts must be made to ascertain the effectiveness of educational methods and offerings. It may be safely stated that the final test of educational services lies in the capacity of the graduates to meet the needs and demands of their work after leaving school. The importance of follow-up services to the graduates and the school is gradually being recognized. Because of this, follow-up programs have become a part of many school systems in recent years.

The responsibility for effective training is threefold. First, the state has the responsibility of providing adequate training facilities; second, the youth has the responsibility of making the best use of these facilities; and third, the school has the responsibility of seeing to it that the training offered through facilities provided by the state is of the type and caliber that will assure efficient workers and contributing members of society. It is with the above thoughts in mind that this study of the 1942 and 1943 graduates of Maggie L. Walker High School was undertaken. It would seem that after five years of operation an appraisal of the training offered at this high school should be undertaken.

This study is not the work of one man. It represents the combined efforts of many working together. Therefore, it is with a keen sense of appreciation that the writer wishes to express thanks to the many graduates, parents, and friends, who so willingly co-operated in lending assistance and so freely gave information that made this study possible. Especially to Mr. James E. Segear and his office staff many thanks. To the teachers of Maggie L. Walker High School, who offered assistance through their suggestions and criticisms, the writer acknowledges great obligation.

Maggie L. Walker High School was dedicated and opened its doors September, 1938. Up to June, 1943, this school had trained and graduated 294 students. In order to contact and include all those students who had graduated in this study, it was decided to use the questionnaire survey method. Since the response from the questionnaires was satisfactory, the questionnaire survey method was supplemented by the personal interview methods. After a suitable questionnaire form was decided on, the blank was mailed to all former students who graduated during the years 1942 and 1943. Of the questionnaires that were mailed out, 26 were sent back by the post office because of incorrect addresses. In each of these cases the party had changed address and had not given forwarding ones.

After two weeks, a follow-up card was mailed to the graduates who had failed to return the questionnaires. Of the 284 questionnaires that were sent out through the mail, 126 were filled out and returned. As this did not seem to be a satisfactory percentage upon which to base an appraisal of Walker's program, it was decided to supplement this percentage by visiting the homes of all those graduates who had not filled out and returned the questionnaires. These personal interviews brought the total number, from whom information was available, to 251. This number represents a 90 per cent return. The distribution of returns, according to major courses from which the students were graduated, is shown in Table I.

While the returned questionnaires were filled out clearly with the desired informa-

TABLE I. Employment Census of 251 Walker Graduates, 1942 and 1943, According to Major Courses

Major courses	*Number returns*	*Number employed*	*Number not gainfully employed*	*Number married*	*Number entered college*	*Number entered other schools*
Art	3	2	0	0	1	
Beauty culture	29	26	3	3	0	2
Barbering	1	1	—	—	—	—
Building maint.	8	6	2	0	1	0
Caf. Service	24	14	8	1	3	1
Clothing	27	17	10	4	1	2
Com. foods	8	8	0	0	0	0
D. O.	23	17	2	1	3	8
Homemaking	14	8	7	1	0	1
Gen. occupations	86	66	20	6	6	6
Masonry	9	6	0	0	0	0
Shoe repair	19	15	1	2	3	0
Totals	251	186	53	18	18	20
Per cent	100	74	21	7	7	8

TABLE II. Employment Census of 130 Walker Graduates, 1942, According to Major Courses

Major courses	*Number returns*	*Number employed*	*Number not gainfully employed*	*Number married*	*Number in college*	*Number entered other schools*
Art	2	2	0	0	1	0
Beauty culture	18	15	3	3	1	0
Barbering	0	—	—	—	—	—
Building maint.	4	4	0	0	0	0
Caf. Service	11	5	4	0	2	1
Clothing	15	11	4	1	0	1
Com. foods	4	4	0	0	0	0
D. O.	12	7	1	1	3	3
Foods	5	3	2	0	0	0
Gen. occupations	40	24	16	6	5	1
Masonry	5	2	—	0	0	0
Shoe repair	14	10	1	2	3	0
Totals	130	87	31	13	15	6
Per cent	100	67	24	10	12	5

This study is not the work of one man. It represents the combined efforts of many working together. Therefore, it is with a keen sense of appreciation that the writer wishes to express thanks to the many graduates, parents, and friends, who so willingly co-operated in lending assistance and so freely gave information that made this study possible. Especially to Mr. James E. Segear and his office staff many thanks. To the teachers of Maggie L. Walker High School, who offered assistance through their suggestions and criticisms, the writer acknowledges great obligation.

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tion, it should be pointed out that the visits to the homes and the interviews with the graduates gave an added touch that is not conveyed by printed or written matter. These visits remain one of the most pleasant and gratifying experiences in connection with this entire study. In many cases the writer was greeted with a "what-do-you-want" attitude, but when it was made known that the interviewer was from Walker High School expressed hospitality and rapport suddenly changed prevailing attitudes. Unless one should make such home visits, one would never understand or sense the love and admiration that the people of the community hold for Walker school. Such experience leaves one with a *worth-while feeling;* a feeling which comes to an individual who seemingly labors for the unattainable, yet suddenly discovers that all his efforts and labor are not wasted. It is because of these interviews with graduates, parents, and friends that the writer feels these data have added significance and far-reaching implications.

Employment Census

Tables II and III give data concerning employment census of 1942 and 1943 graduates respectively. It should be noted that while 12 per cent of the 1942 graduates entered colleges, only about 4 per cent of the 1943 graduates attended college. This low percentage of the 1943 graduates who entered college may be attributed to the number of males who joined the armed forces. Also, the lure of high paying employment opportunities may have kept some from attending college who ordinarily would have matriculated. This variance in percentage of the number entering college would account for the variance in the percentage of those gainfully employed as shown in Tables II and III. Ordinarily, one would expect the percentage of gainfully employed to be greater for the 1942 graduates, by reason of the fact that these graduates had the advantage of roughly 12 months more in which to seek employment and adjustment. Yet on the other hand the over-all picture of employment seems relatively satisfactory, as shown in Table I. One should not become alarmed over the 21 per cent listed as not gainfully employed, for included among them are those who have: (1) enrolled in college, (2) entered selective service, and (3) those who have married and become housewives. It should be pointed out that while only 5 per cent of the 1942 graduates entered schools other than colleges, 12 per cent of the 1943 graduates sought to further their training. It seems that these graduates continued their training in (1) night schools, (2) private business and trade schools, and (3) NYA training programs. The 7 per cent who matriculated in colleges selected the following institutions of high learning: Hampton Institute, Shaw University, Tuskegee Institute, Virginia State College, Virginia Union University, and A. & T. College.

Employment Status

As was pointed out in the beginning of these discussions, one of the primary reasons for this study is to seek to appraise the training program as offered at Walker High School. These considerations pose the question, "Does our curriculum need changes so as to more effectively serve local business and industrial needs?" Many academic schoolmen and vocational industrial education administrators have come to judge or appraise the effectiveness of a training program by the number of graduates who find employment in the field in which they have received training. From their point of view, there is little justification for training students for a particular occupation when few or none of those who are trained for that occupation ever enter employment of that occupation, or within that occupational field. From Table IV it will be observed that of 90 vocational students of the 1942 class who returned the questionnaires or who were interviewed, only one third were working in the occupations for which they had received training, while 18 per cent of the graduates had never worked at the occupation for which they had received training. However, the over-all picture for 1942 and 1943 graduates is not quite so alarming as Table VI shows that only 20 per cent as having never worked in their occupation. The writer is much concerned with this aspect of the problems of vocational-industrial education. Consequently, much effort was made to ascertain the reasons why so many graduates had never worked at the occupation for which they had received training. Information from questionnaires returned, and facts gathered from interviews, seem to indicate the following reasons why so many graduates have never worked at the occupation for which they received training:

A. Inability to find employment in the desired field.
B. Personal health condition made it advisable not to work in the occupation trained for.
C. Made mistake in the choice of an occupation.

While the percentage of graduates who had never worked in the occupation for which they had been trained is not extremely high as compared with findings in similar studies, yet this percentage should be somewhat unsatisfactory. It seems that the justification of a training course is measured by the percentage of placements within the occupation for which the training was given. An analysis of the reasons given for not working in the occupation trained for will raise the question of responsibility. It may readily be seen that two of the reasons given in the foregoing

TABLE III. Employment Census of 121 Walker Graduates, 1943, According to Major Courses

Major courses	*Number returns*	*Number employed*	*Number not gainfully employed*	*Number married*	*Number in college*	*Number entered other schools*
Art	1	1	0	0	1	0
Beauty culture	11	11	0	1	0	2
Barbering	11	1	0	0	0	0
Building maint.	4	2	2	0	1	1
Caf. Service	11	9	4	1	1	0
Clothing	10	6	6	3	1	1
Com. foods	4	4	0	0	0	0
D. O.	11	10	1	0	0	5
Foods	9	5	4	1	—	1
Gen. occupations	40	42	4	0	1	5
Masonry	4	4	0	0	0	0
Shoe repair	5	5	0	0	0	0
Totals	121	100	21	6	5	15
Per cent		83	17	4	4	12

TABLE IV. Employment Status of 90 Vocational Graduates, 1942, Walker High School, According to Major Courses

Major courses	*Working at occupation trained for*	*Never worked in occupation*	*Working in allied occupation*	*Number times changed jobs* 0	1–2	3–4	*Reasons for job changes*
Art	0	2	0	1	0	0	Health
Beauty culture	12	3		5	5	0	Physical
Barbering	—	—	—	—	—	—	defects
Building maint.	2	1	2	3	1	0	Better pay
Caf. Service	5	0	3	3	1	0	Bad work
Clothing	0	6	1	2	3	0	conditions
Com. foods	0	0	2	1	1	0	Long hours
D. O.	5	0	3	3	2	0	Dislike for
Foods	0	2	2	0	2	0	nature of
Gen. occupations	—	—	—	3	11	4	work
Masonry	0	2	1	1	2	0	Job dis-
Shoe repair	6	0	3	0	5	1	continued
Totals	30	16	17	22	33	5	
Gen. per cent	33	18	19	25	37	5	

question the adequacy of the guidance service as offered by the school. Why did so many of the graduates make a mistake in their choice of an occupation? Why did they not discover their mistakes before graduating? It would seem to be the responsibility of the school not only to guide students in the choice of an occupation, but also to endeavor to place and follow-up those who graduate. There seem to be many good reasons for this. First of all, such placement and follow-up service tends to co-ordinate and strengthen the relations between school and industry and business. Second, this is one of the most effective means of tuning up the vocational curriculum.

It should be pointed out that in several of the occupational fields included in this study graduates encountered much difficulty in securing employment. In many cases these difficulties were due to restricted employment opportunities so prevalent in a southern labor pattern. It seems a pity that race and color barriers should be thrust upon young workers so early. This, then is a challenge to school administrators and community leaders. Graduates who had majored in *clothing* found few if any opportunities for employment in their occupational field. It seems that employers are not willing to hire young Negro seamstresses. The alternative for these graduates was to set up their own business, or to accept any unrelated work that should come their way. But economic status of the graduates dictated the acceptance of the easiest way out. Also, it should be remembered that managerial ability is not within the ability or training of every student. Several of the graduates, particularly those who had specialized in beauty culture and barbering, had never worked in the occupation for which they had been trained because they were unwilling to follow through the waiting period so peculiar to these occupations. New or young barbers and beauty operators must be willing to accept meager earnings while they *build up their trade*. As these workers become experienced and their clientele increases, their earnings likewise increase. This is true primarily because of the method of pay as practiced in these occupations. Most barber and beauty shop operators are paid on the basis of a 40–60 commission. It would seem that this unwillingness and impatience on the part of the graduates was greatly encouraged by the lure of many good paying wartime employment opportunities.

In passing it should be mentioned that of 12 graduates who took civil service examinations, only 1 failed to make a passing score. Also, a list of occupations, under Table XIV gives some idea of the type of work the graduates were engaged in.

Turnover

Job shifting or changing from job to job is costly to business, industry, society, and the individual alike. Several complaints had been voiced to the effect that Walker graduates changed jobs too often. During normal times and time of low employment one would expect the percentage of turnover to be relatively low. While on the other hand full employment and economic prosperity cause much turnover. This is revealed by statistics dealing with adult workers. If this shifting from job to job is not uncommon among older workers, it should follow that this shifting among young workers might be even higher. However, it should be remembered that when employment begins, this job shifting process goes on for several years. Young people leaving school give little thought as to whether the employment is suited to his abilities, training, or personality. The desire to get a paying job and many times the bare necessity of earning some money causes the young worker to enter the first employment that comes his way. After a few weeks of work he discovers one of three things: he does not like the job, he is not suited for it, or he can secure a better paying job. It is this type of occupational maladjustment that is so costly to the worker and the employer. The worker loses time and often morale, while the employer loses whatever is incurred in the process of hiring and training, as well as breakage and waste. It seems, then, that it is most desirable to reduce turnover among young workers.

Nevertheless, this job shifting was not found to be unusually high among the subjects of this study. For according to Table VI, 24 per cent of the graduates had not changed jobs at all, while less than 1 per cent had changed jobs three to four times. A number of answers were given to the question, "Why have you changed jobs?" A list of the answers follows:

1. Work was against my health
2. Hours were too long, with no time off
3. Bad working conditions
4. Better pay
5. Did not like the work
6. Too many bosses
7. Job discontinued

It seems that all of these separations, with exception of two cases, were voluntary. There was one case where the job terminated, and another case where the worker was discharged. However, all cases where the separation was due to long hours occurred among domestic service workers. It should be pointed out that a large number of the separations because of poor health were graduates working in the occupation for which they had been trained. It may seem that some of these conditions imply inadequate guidance service as well

TABLE V. Employment Status of 75 Vocational Graduates, 1943, Walker High School, According to Major Courses

Major courses	*Working at occupation trained for*	*Never worked in occupation*	*Working in allied occupation*	*Number times changed jobs* 0	1–2	3–4	*Reasons for job changes*
Art	0	1	0	0	0	0	Health
Beauty culture	6	4	0	4	1	0	Physical defects
Barbering	0	1	0	0	1	0	Better pay
Building maint.	0	0	2	0	1	0	Bad work conditions
Caf. Service	6	3	0	1	2	2	Long hours
Clothing	1	8	1	3	3	1	Dislike for nature of work
Com. foods	0	2	2	3	1	0	Job discontinued
D. O.	8	0	3	2	3	1	
Foods	2	5	2	3	2	0	
Gen. occupations	—	—	—	2	20	4	
Masonry	0	4	0	2	2	0	
Shoe repair	3	2	0	1	2	1	
Totals	26	30	10	21	38	9	
Gen. per cent[1]	36	40	13	28	50	12	

[1]Divisor — 75 (total returns).

TABLE VI. Employment Status of 165 Vocational Graduates, 1942 and 1943, Walker High School, According to Major Courses

	Working at occupation trained for	*Never worked in occupation*	*Working in allied occupation*	*Number times changed jobs* 0	1–2	3–4
Art	0	3	0	1	0	0
Beauty culture	18	7	0	9	6	0
Barbering	0	1	0	—	—	0
Building maint.	2	1	2	3	2	2
Caf. service	11	3	3	4	2	1
Clothing	1	14	2	3	5	0
Com. foods	0	2	4	4	4	0
D. O.	13	0	6	5	5	1
Foods	2	7	4	3	4	0
Gen. occupations	—	—	—	5	31	4
Masonry	0	6	1	3	4	0
Shoe repair	9	2	3	1	7	2
Totals	56	46	25	41	70	10
Per cent	34	28	15	26	42	6

as inadequate methods of selecting students for vocational courses.

Occupational Maladjustment

Job satisfaction is a morale builder as well as a production booster. A satisfied worker would seem to be one who has found the work for which he is best suited; a job which offers minimum difficulties; a round peg in a round hole. This big job of matching the young workers to jobs should begin early in the training of the youth. This would imply a grave responsibility for the schools. The school is not only charged with the job of training the youth for active participation in the social, political, religious, and economic life of the community, but with the responsibility of follow-up during the early employment years to make necessary adjustments. If a graduate fails in his occupation, the school should seek to discover the reason why. Such information would do much to improve the school's guidance services, selection and teaching methods, and vocational offerings.

In this study efforts were made to ascertain the nature of the difficulties the graduates encountered during their early employment. According to Table VII a large number of the graduates were dissatisfied with their jobs because of bad working conditions and long working hours, while some were dissatisfied because they were not working at the occupation for which they were trained. Again, it should be pointed out that by far the larger percentage of job dissatisfaction was found among domestic service workers. Long hours of work and a very low rate of pay a practice of many employers in their dealing with Negro labor.

One should not be surprised at the number of graduates who were found to be dissatisfied with their jobs. For it should be expected for one to be discontented when he has spent years training for an occupation and then after completing his training has to accept employment in some other occupation. While on the other hand, the school should not overlook or underestimate its responsibility in this connection. It would appear that if a large percentage of maladjustment is found among the graduates, the school should critically appraise its training program. Furthermore, through interviews with the graduates it was found that a large number of them were very sensitive about the lack of assistance given them by the school during their early employment period.

Weekly Earnings

To a great extent, the earning power of a graduate is an index to his success. It may be found that in many studies earnings are the major factor in the criteria for success. The weekly earnings of the graduates who are included in this study were found to be in keeping with expectation for a wartime economy. In several cases, female workers were earning as much as $35 to $39.99 per week, as shown in Table VIII and Table X. It should be noted that the mean weekly earnings for the 1943 graduates is higher than that for the 1942 graduates. Since the 1942 graduates had an advantage of approximately 12 months' work experience, seemingly these workers should show a larger mean weekly earnings. This differential may be accounted for by reason of two conditions. First, the average prevailing wage during June, 1943, was higher than it was during 1942. This means that the starting rates would be higher for the 1943 graduates. Second, it must be assumed, from these data, that the 1942 graduates were inclined to stick to their old jobs rather than swap around for more highly paying war jobs. It was found that many female workers of the 1943 class were employed on jobs that would normally be held by male workers. However, it may be seen from Table X that the bulk of the female graduates were earning around $15 per week. Furthermore, as the Tables would indicate, the present mean weekly earnings were found to be more than the mean starting weekly earnings. This may indicate some advancements and promotions among the graduates.

Training Appraisals

In so far as the graduates have had a chance to test out the training that they received, a logical question that would follow might be, "What do the graduates think of their training?" Looking at Table XI, one may get some sort of answer to this query. According to this Table, 57 per cent of the graduates seem to indicate that their training has proved a great asset to them. While on the other hand, 31 per cent of the graduates seem to think that their training has been of little value to them. Does the answer of this 31 per cent carry any implications to teachers and administrators? It should seem that it is this 31 per cent that should cause great uneasiness to teachers, and patrons. Some sort of study or investigation of this 31 per cent should be made so as to determine the reason for this condition. It would seem that this percentage is extremely high, as compared with results obtained in other studies of this nature. A careful study of data listed in Table XI shows that a noticeably large number of graduates majoring in clothing, masonry, foods, and general occupations indicated that their training has been of little value to them. Then, referring to Table VI, it will be noted that these seem to be the same graduates who had indicated that they had never worked at the occupation for which they had trained. The question that arises now is why have these graduates not worked at the occupation for which they were trained? Some sort of answer to this question may be found listed in Table IV. It would seem, then, that the reasons why so many graduates have never worked at the occupation for which they had trained are due to employment difficulties caused by racial barriers. It is only natural for one to place little value on a thing that is of little or no use. As it has been pointed out in other parts of these discussions, the school's responsibility does not cease with the training and graduation of the students. The school has a definite responsibility in seeing to it that the graduates are placed

TABLE VII. Employment Difficulties and Maladjustments of 251 Walker Graduates, 1942 and 1943

Nature of difficulties	*Rank order*	*Reasons for difficulties*
Dissatisfied with job	1	Bad working conditions and hours
		Physical deficiences
Not working at occupation trained for	2	Made wrong vocational choice
		Lack of experience
Duties assigned not those hired to do	3	Racial discrimination
Inability to secure employment of choice	4	Racial discrimination

TABLE VIII. Weekly Earnings of 95 Walker Graduates, 1943

Range	*Frequencies*				*Percentage in increase*
	Starting		*Present*		
	Male	*Female*	*Male*	*Female*	
$ 5.00–$ 9.50	3	15	0	5	
10.00– 14.50	10	28	3	24	
15.00– 19.50	11	9	7	10	
20.00– 24.50	4	1	7	11	
25.00– 29.50	1	1	5	2	
30.00– 34.50	0	0	3	6	
35.00– 39.50	0	0	2	1	
40.00– 44.50	0	0	0	0	
45.00– 49.50	0	0	0	0	
Mean weekly earnings	$18.95	$11.92	$21.55	$15.25	

were the chief complaints among these workers.

Many graduates were found to be employed in wartime jobs. Many of these jobs were civil service occupations. It was this group that complained of being hired for one job, yet the duties assigned were quite unrelated to what the person was hired to do. In one case a graduate was hired by a firm as a sheet-metal helper, but the duties that were assigned consisted of sweeping floors. This seems to represent

in employment after graduation. If the school takes the responsibility to train students for occupations not knowing whether there are employment opportunities in those occupations, then it follows that it is the school's responsibility to see to it that such employment opportunities are created or employment barriers are broken down.

Examination of the questionnaire returned reveals that well over 60 per cent of the graduates think that chemistry and business courses should be added to the school's curriculum. Other subjects that have been suggested for addition to the curriculum are listed in Table XI. It should be pointed out with great emphasis that many of the graduates indicated that as a result of their work experiences they feel the need of some knowledge of chemistry, business courses, and other subjects which they did not receive at the Walker High School, and many indicated they would have elected these subjects had they been offered.

Graduates Make Suggestions

The suggestion box idea has worked well in many industries. Many improvements in products and processes have come about as a result of suggestions from workers. Such improvements have proved beneficial to the worker, management, and society. With this in mind, the graduates were asked to make suggestions which might be used as a basis to improve their former school. Listed below are changes which former graduates of Walker suggested:

1. More positive attitude of the teachers toward the graduates.
2. Walker should have college preparatory courses and evening school.
3. Encourage graduates to continue training after high school graduation.
4. General occupations students should be given more experiences in shop training.
5. Discontinue English-Social Studies as combination subject.
6. Require twenty units for graduation.
7. Give more attention to cadet drilling.
8. Apprentice all vocational majors out for work experiences.

Few graduates felt that the school could be of no further service to them, while most of them felt that the school can serve them in the future. Again, this brings up the question of the school's responsibility to its graduates. The graduates were asked "How can Walker be of further service to you?" The answers were sifted and condensed and grouped in the following manner:

1. Offer placement service
2. Furnish references
3. Offer continuation courses
4. Keep graduates informed of school news
5. School participate in community activities

Expressions from Graduates

One would have to talk to the graduates or read their letters to get a r al *close-up* on how they feel about their school. Listed are excerpts from letters received from graduates in connection with this study. A mother writes for her son who is serving with the armed forces:

"But I can say this much for him, he really loved Walker and his trade, shoe repairing. He was working at his trade making $40 per week when called to the army."

"I am now in charge of a shop with a couple of highly trained men working with me, and I can say that Walker's training will hold its own no matter where."

"I do think that it should be impressed upon the students that Walker is a vocational school and not an academic school. Give them the necessary guidance which will be beneficial to them in their choice of an occupation."

"I was hired to take charge of a refinishing room in a big furniture store, but when they saw that I was a Negro, they told me that the other workers would complain."

TABLE IX. Weekly Earnings of 130 Walker Graduates, 1942

Range	Frequencies: Starting Male	Starting Female	Present Male	Present Female	Percentage increase
$ 5.00–$ 9.50	0	15	0	8	
10.00– 14.50	4	8	2	18	
15.00– 19.50	10	5	3	12	
20.00– 24.50	6	2	7	7	
25.00– 29.50	5	0	5	2	
30.00– 34.50	0	0	1	1	
35.00– 39.50	0	0	5	0	
40.00– 44.50	0	0	0	0	
45.00– 49.50	0	0	0	0	
Mean weekly earnings	$15.25	$10.00	$20.52	$11.75	

TABLE X. Weekly Earnings of 251 Walker Graduates, 1942 and 1943

Range	Frequencies: Starting Male	Starting Female	Present Male	Present Female	Percentage increase
$ 5.00–$ 9.99	3	30	0	16	
10.00– 14.99	14	36	5	42	
15.00– 19.50	21	14	10	22	
20.00– 24.50	10	3	14	18	
25.00– 29.50	6	1	10	4	
30.00– 34.50	0	0	4	5	
35.00– 39.50	0	0	8	1	
40.00– 44.50	0	0	0	0	
Mean weekly earnings	$17.38	$11.66	$23.93	$14.52	

TABLE XI. Appraisal of Training As Given By 251 Walker Graduates, 1942 and 1943, According to Majors

Major courses	Training of great asset	Training of little value	Subjects of most value	Subjects that should be added
Art	1	2	English	Chemistry
Beauty culture.....	17	5		
Barbering	1	2	Vocational	Business
Building maint.....	3	1	practice	courses
Caf. service	12	3		
Clothing	10	14	Mathe-	Typing
Com. foods.....	2	2	matics	
D. O.....	15	4		
Foods	7	7	Biology	Physics
Gen. occupations....	51	29		
Masonry	1	5	D. O.	Languages
Shoe repair.....	13	4	theory	
Totals	133	78		
Per cent.....	57	31		

TABLE XII. Appraisal of Training As Given By 130 Walker Graduates, 1942, According to Majors

Major courses	Training of great asset	Training of little value	Subjects of most value (rank order)	Subjects that should be added (rank order)
Art	0	2	English	Chemistry
Beauty culture.....	12	2		
Barbering	—	—	Vocational	Business
Building maint.....	1	1	practice	courses
Caf. service	5	1		
Clothing	2	7	Mathe-	More
Com. foods.....	2	0	matics	mathe-
D. O.....	7	0		matics
Foods	2	2	Biology	Languages
Gen. occupations....	18	10		
Masonry	1	2	D. O.	Physics
Shoe repair.....	10	3	theory	
Totals	60	30		
Gen. per cent ...	46	43		

"It would be a lot of service if you would talk to the students about personal appearance and conduct in the public."

Summary and Recommendations

From the foregoing discussions based on data included in this study, certain conclusions seem justified. It would seem then, that:

1. Of the 251 graduates included in this study, 75 per cent were gainfully employed, while only 7 per cent entered college.

2. One hundred sixty-five vocational graduates were included in this study and of this number 34 per cent were working in the occupation for which they were trained, while 28 per cent had never worked in the occupation for which they had trained.

3. Only 6 per cent of the graduates had changed jobs more than twice since graduation.

4. A large number of the graduates were dissatisfied with their jobs, mainly because of (1) long hours, (2) not employed in the occupation for which they were trained.

5. Thirty-one per cent of the graduates thought the training they received at Walker has been of little value to them, while English and vocational practice were voted as the most valuable subjects.

6. Graduates suggested that chemistry, business courses, physics, and more mathematics be added to the school's curriculum.

7. The mean starting wage for male graduates was $17.38, and $11.66 for female workers.

8. The graduates were found to be gainfully employed in 37 different occupations.

9. There is great need for more adequate placement services.

10. Only 8 per cent of the graduates entered college, while 8 per cent also sought to further their training by attendance at night school and private vocational schools.

11. The greatest amount of job dissatisfaction was found among domestic and personal service workers.

Recommendations

The economic welfare of a community, to a very large extent depends not only on the easy flow of goods and service, but also on the efficiency of its labor market. Efficiency in the distribution of labor involves several important considerations. Among these, there are the problems of training workers and the scientific placement of personnel. Efficiency in the distribution of labor has as a goal the placing of each worker in the right kind of job according to the interests and abilities of the worker. Any other method involves an enormous waste in economic goods and human efforts. Such wastes present a great loss to the community and the individual. However, it must be remembered that the problem of training and placing workers is no small undertaking. One phase of the problem is incomplete without the other. It would seem, then, that each phase would dovetail with the other. If the training program is justified and thoroughly administered, the placement of the young workers should be relatively easy. While on the other hand, if under normal conditions it is difficult to place the workers that have been trained, then one should view with suspicion the training program offered as well as the administrative methods involved. To effect a balance between these varying factors, some stabilizing services are necessary. Such services have come to be recognized as guidance and follow-up services.

Guidance Services: From data included in this study, there seems to be need for more adequate guidance services at Walker High School. In a complex and highly industrialized society the student is in great need of assistance in his choice of an occupation. It is indeed pathetic for a student to spend two years training for an occupation, graduate from the occupation, work in that occupation for several months, or even a year, and then discover that he has made a mistake in his choice of that occupation. Students should be orientated through a number of industrial-arts shops for exploratory purposes and at the same time given a course in the study of occupations. Interviews by the counselor is the next logical step in a well-organized program of guidance services. The counselor should have available the complete school record of the student as well as aptitudes and other special tests that would be valuable in assisting the student in making a vocational choice. Then, after the student has decided on some vocational choice, there will be need for guidance and assistance in the selection of related and auxiliary subjects. But the counseling does not stop here. There will be continual need for checking and adjustments throughout the training period. Let it be remembered that this is not the sole responsibility of the counselor, for the teachers who often know the students as individuals must give full co-operation to the counselor. Furthermore, it is not the purpose of these recommendations, nor this study to propose an organized guidance setup for Walker, but rather to point out those features or services which seem to need strengthening or initiating.

In addition to more assistance and counseling to students in their choice of an occupation before specialization begins, it is recommended that *the school seek to place its students after graduation, through its guidance office.* These placements should match the graduates according to their training, abilities, and personalities. Again, it should be pointed out that placement of graduates is not the sole responsibility of the counselor or placement officer. The subject teacher, too, has definite responsibilities in this connection. Vocational teachers should be justly concerned as to whether students who majored in their particular shop find employment in that occupation or allied occupations. The teacher of printing should see to it that his graduates find employment in printing occupations. He must feel sure that there

TABLE XIII. Appraisal of Training As Given By 121 Walker Graduates, 1943, According to Majors

Major courses	*Training of great asset*	*Training of little value*	*Subjects of most value (rank order)*	*Subjects that should be added (rank order)*
Art	1	0	English	Chemistry
Beauty culture	5	3		
Barbering	1	2	Vocational practice	Business courses
Building maint.	2	0		
Caf. service	7	2		
Clothing	8	7	Mathematics	More mathematics
Com. foods	0	2		
D. O.	8	4		
Foods	5	5	Biology	Languages
Gen. occupations	33	19		
Masonry	0	3	D. O. theory	Physics
Shoe repair	3	1		
Totals	73	48		
Gen. per cent	60	39		

TABLE XIV. Types of Occupations in Which 251 Walker Graduates, 1942 and 1943, Found Employment

(Listed according to rank order)

1. Laundry (general)
2. Elevator operator
3. Maid (general)
4. Porter
5. Shoe repairman
6. Beautician
7. Marker (laundry)
8. Waitress
9. Cook (general)
10. Cafeteria worker
11. Nurse maid
12. Cleaner and presser
13. Stemmer (tobacco)
14. Presser
15. Clerk, office
16. Seamstress
17. Cook, pastry
18. Machine operator (paper mill)
19. Clerk, sales
20. Hospital attendant
21. Inspector, garment repair
22. Laborer (general)
23. Packer-wrapper (dept. store)
24. Soda jerker
25. Wood catcher (woodworking)
26. Meat packer
27. Bushelman
28. Clerk, photo
29. Car cleaner, RR.
30. Stock girl
31. Radio repairman
32. Doorman, theater
33. Houseman
34. Funeral attendant
35. Nursery attendant
36. Candy packer
37. Office machine repairman

are employment opportunities in the printing field for all those who finish the prescribed course of his printing shop. In every case this will mean that the teacher will from time to time make business contacts and at all times know the absorptive power of the printing occupations in his community. Also, this will mean that there should be more co-ordination and co-operation of vocational teachers with business and industries.

Guidance in the choice of an occupation, and placement in that occupation do not complete the picture. Walker High School needs to exert more efforts to follow up its graduates, especially during the occupational adjustment period. Follow-up is necessary to give the individual additional help in seeking the advanced jobs to which he may aspire and in preparing for and securing these advancements. It is recommended that a going program of follow-up services be instituted. At regular intervals follow-up studies of those who have been graduated should be made. It is suggested that intervals of two years are often found to be practical and effective.

Expansion of Offerings: There can be little doubt that there will be mistakes in vocational choices when the offerings of the school are seriously limited. In this study it was discovered that many graduates specialized in certain occupations only because that particular course was the only major course that had a vacancy at that time. *It is, therefore, recommended that Walker enrich its curriculum through an expansion of its offerings.* This should be a two-pronged expansion. In the first place, there should be added several vocational courses. This would mean that the students would have a larger variety from which to make vocational choices. The fundamental principles of vocational-industrial education and guidance demand that there be a larger variety of offerings from which students may make choices and thus develop their interests, abilities, and aptitudes. In the second place, there should be added subjects in related technical information. Efficiency as a worker is conditioned by the morale of the worker and his surroundings. And this is clearly the responsibility of the school to give training in social understandings and industrial relationships so as to make it possible for skills, knowledge, and judgment to contribute to the industrial success of the worker. It is recommended that the following subjects and courses be added to Walker's curriculum: *chemistry, applied mechanics, mechanical drawing, business courses, labor and occupational relations, automobile mechanics, electricity and radio, sheet-metal work* and *air conditioning.*

Keeping the Graduates Informed: Keeping graduates informed of school happenings is another service so desired by a large number of the graduates. To provide for this service it is suggested that a fee to cover a two years' subscription to the *Voice* be included in each senior's graduation budget.

Throughout this study the writer has made great efforts to present impartial and unbiased interpretations based on reliable data. It would seem, then, that these recommendations have aspects of validity in so far as they are derived results of scientific educational research. However, the problems treated in this study have many and far reaching ramifications which may suggest leads to further study if more conclusive results are desired.

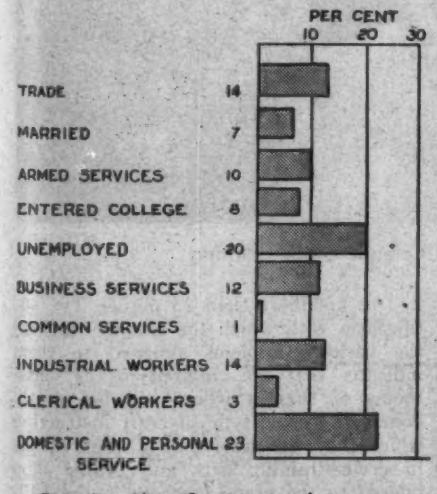


Fig. 1. Classification and occupational distribution of 251 Walker graduates, 1942 and 1943. Included among the 20 per cent unemployed are those graduates who have married and entered college

An In-Service-Training Arts and Crafts Workshop

*A. G. Pelikan**

The term *in-service training* is becoming increasingly used in educational circles and covers in general the training offered to teachers at the expense of the various school boards. These classes are sometimes conducted during regular school hours, but most frequently are held after school. The type of instruction offered varies from organized teachers' conferences where prominent educators discuss contemporary educational problems, and at which attendance is mandatory, to voluntary classes or discussion groups made available to all those teachers who wish to take advantage of them.

A recent experiment carried on in Milwaukee has worked out most successfully and will be continued next year. At a conference of the art supervisory staff it was brought out that although there was an increasing interest in craft work among the elementary classroom teachers, few of them, if any, had any training in the use of craft tools or a knowledge of the various art media and their possibilities. Furthermore it was found that there was little opportunity for them to acquire this knowledge and skill without requiring them to sign up for special evening classes limited to one phase of craft work only.

It was decided that the solution to the problem would be partly solved if we could offer the kind of craft instruction needed by the teachers in an arts and crafts workshop of our own. One of the art supervisors, Mr. Gordon Borchardt, reported that there was an empty room in the basement of the School Administration Build-

*Director of Art Education, Public Schools, Milwaukee, Wis.

Mr. Gordon Borchardt teaching toymaking; painting wooden toys

Using home-made looms

ing which was not being used and which had possibilities. The plan of having an arts and crafts workshop was presented to Mr. L. Goodrich, superintendent of schools, and he approved the idea and steps were immediately taken to make the workshop a reality.

The first step was to get the room equipped with furniture and tools. This was done by requisitioning items such as tables, benches, chairs, etc., which had been returned from other schools and for which no charge was made against the art budget. Art supplies and tools were requisitioned from stock and charged against the elementary art budget. Tool boards, shelves, clay bins, a sink, and a gas stove were provided, and soon a completely equipped workshop was ready.

The next step was to plan the type of work to be offered. Each of the four assistant art supervisors volunteered to teach a certain type of craft work after school (from 4:00 to 6:00 p.m.) once or twice a week. The following announcement of classes was prepared and sent to the schools as part of the superintendent's official bulletin:

Arts and Crafts Experimental Workshop

An experimental workshop has been planned and equipped in the administration building by the art department and will be used to give instruction in arts and crafts to interested teachers in grades 1 to 8.

Free class instruction and demonstrations will be given in the four subjects listed below on one day a week as follows:

Woodwork, including the making of toys, marionettes, etc., by Mr. Gordon Borchardt

Modelling and Carving, in clay, plaster of Paris and wood, by Miss Myrtle Uehling

Weaving and Needle Work, with simple looms and a variety of materials, by Miss Olive Reitmann

Block Printing, with use of simple materials, by Miss Mary Bury

Because of limited space and the need for individual instruction the opportunity to work one afternoon each week in each course will be limited to the first twenty teachers in each group who phone the art department and make arrangements for work space. It is desirable that teachers who wish to enroll in any one of these classes plan to attend the session scheduled for them each week in order to assure continuity and to utilize the equipment and space available to the best advantage.

Within a week's time almost two hundred teachers had signed up for these courses and quite a number could not be accommodated since the classes were limited to not more than 25 pupils. The enthusiasm with which the teachers tackled the various problems assigned to them indicates that the children in the classrooms of these teachers will be greatly benefited by the type of craft instruction which they will receive as a result of the in-service-training arts and crafts shop offered to the grade teachers in the Milwaukee Public Schools.

Making frames for weaving

Linoleum block printing

Justice remains the greatest power on earth. To that tremendous power alone will we submit.—*Harry S. Truman.*

Youth in Postwar Employment

*Mrs. Christine Florance**

Industry has been thinking and planning a long time for the postwar future. It is fair and right that much of this planning is for the returning serviceman. The men now in service will be the foremen, managers, leaders, and entrepreneurs of tomorrow, but what of the rank and file of their future personnel now enrolled in our shops and classrooms? Will our present teen-age population make the kind of workers who will help to safeguard the freedoms that our soldiers have been fighting and dying to protect, such freedoms as have made American industry a world-wide symbol of success and our standards of living the highest in the world?

The answer is that they will not make satisfied or productive workers without foresight and planning on the part of those adults to whom their education is entrusted.

In the past, such matters as job training and placement were allowed for the most part to take care of themselves, but times have changed and today our young workers and prospective workers are surrounded by such abnormal working conditions that thoughtful people everywhere are becoming seriously concerned about their future effects on the youth of the land.

Due to the shortage of experienced help, more students than ever before are or have been working on a part-time basis or during vacations. Although helpful to industry, being thrust prematurely into jobs formerly held by older and more experienced workers may have harmful results to the individual. For example, students from vocational and trade classes are at a premium, and many are able to earn more money than their teachers are paid; sixteen-year-old high school people all over the country are paying income taxes; and it is no longer an unusual sight to see rolls of money regularly in the pockets of teenage workers. Despite this prosperity, many youngsters flit from job to job always seeking more pay for less work; while employers, in their desperation, offer bonuses, recreational programs, and every other inducement within the law to attract these young workers.

There is no objection to this prosperity as such, but some teachers have looked beyond the present and are beginning to wonder about the future effects of such an unnatural entrance into the world of work when more normal economic conditions return now that the war has ended. How will these young workers react to tightened employment conditions? What will their reactions be to the loss of a job to an older and better qualified worker? Can they adjust themselves to lower wages and more rigorous conditions of work?

Employers, because of conditions, have been forced to tolerate loafing, "gold-bricking," absenteeism, lack of interest, initiative, and general incompetence. One employer said of a bus boy guilty of tossing lighted cigarettes from the window of a building on unsuspecting pedestrians, "I would fire him in a minute if I could get somebody to take his place." Soon there will be someone to take his place, and the places of thousands of other young workers who have not learned the importance of proper work attitudes or the need for job skills.

Such an abrupt change from an easy-come-easy-go existence may prove fatal to many of these beginners whose first jobs have been so well cushioned with shock absorbers. They are the innocent victims of wartime conditions; yet they will suffer none the less for their innocence unless those in charge of their training begin now to make plans to protect the benefits work can provide, and at the same time, safeguard these young workers from the inevitable dangers inherent in this situation.

The challenge to help check and prevent these dangers rests in part on the vocational education workers of the country — the shop teachers, the commercial and agriculture teachers, co-ordinators of part-time work programs, and trade teachers. All these have a responsibility and the means for making a vital contribution to the future progress of industry and the vocational success of their students.

Such teachers, because they are one of the vital links between the personality and skills of the students and the needs of industry, need to get a new perspective of the problem. It should be recognized, first of all, that industry profits most when the morale of the worker is high; and morale depends directly on the well-being of the worker, his sense of accomplishment, and his earning power. Vocational teachers need to recall times when jobs were not so plentiful, and workers, in addition to technical skills, had also to have adaptable personalities in order to hold jobs in those days of fierce competition and unemployment. It is possible for such times to come again.

With this perspective, the teacher or co-ordinator will realize that he alone cannot solve all the problems of the young worker in the postwar world. It is, however, his responsibility to see to it that the boys and girls in his care begin now to take out postwar job insurance by becoming acquainted with the basic requirements for job success. The requirements are these: (1) an appreciation of the innate worth and dignity of work, (2) the importance of trying to get along with others, (3) the acquiring of whatever technical skills are necessary to satisfy personal ambitions and meet the requirements of a job.

Many of the boys and girls who pass daily in and out of the classrooms of the nation have already learned the satisfaction of achievement in some job or activity. For those, there is already some appreciation of what work means in our world. They realize, in part at least, that work is a privilege, and that it means not only material independence but an opportunity for personal and social benefits. Unless a student realizes these benefits his work will be just an onerous burden thrust on him by a cold and unsympathetic world.

The vocational or industrial-arts teacher must keep this appreciation of the value of work in mind at all times. By so doing, he will be constantly reminded that through his classes he is laying the foundation when he encourages good working habits among his pupils. With this perspective, such day-to-day tasks as conserving tools and supplies, equal sharing of all shop tasks, and the necessity for individual accomplishment, take on a new meaning and importance to teacher as well as to student.

In all the activities of the classroom and shop, there is the ever present factor of relationship of one worker to another. This is the place to consider with great care the signs of discord among personalities, for it is an almost certain thing that the same personal qualities of easy adjustment or maladjustment that are observed by the teacher in a classroom group, will follow the student into the world of work.

In a study made a few years ago by the Carnegie Foundation, it was found that personal qualities counted 85 per cent in the success of the individual. It is safe to assume that success is still as vitally effected by personality as it has ever been.

Correcting personality defects is a slow and sometimes difficult process, but teachers find that students are genuinely interested in themselves, and if properly used, this interest can be made to yield real improvement in individuals.

The shop teacher may feel that his task is to teach skills only, but let him remember that skills account for the minor share — the 15 per cent — of total success. The teacher might argue further that he is not qualified to teach the *winning of friends and the influencing of people*. However, for the teacher willing to make the effort, any reliable book on guidance techniques will show the way. Nearly all such books have sections on improving personality with dozens of personality traits listed under such headings as appearance, expression, intelligence, emotional control, interests, and social adaptation.

Such check lists are excellent for two reasons: (1) they show the student how many factors go into the making of his total personality; and (2) these check lists help to pave the way to recognition and discussion of individual personality defects. At this stage the teacher will assist the students in planning remedial measures, keeping in mind that better results occur when

*Co-ordinator of Vocational Education, Senior High School, Greensboro, N. C.

the effort is concentrated on one or two traits at a time.

An attempt to improve the personality in the shop, classroom, or laboratory, will not seem unrelated or superficial if the effort is made with job success as the goal. The teacher can further integrate this improvement by announcing the plan of attack in advance as a part of the year's work, and by applying it throughout the year in discussion and practice.

Such activities are the essence of the real guidance every true teacher would like to give. Tying shop or classroom behavior into real life success provides many opportunities for helping students to make wiser decisions in the matters of work selection and the preparation for getting a job.

With job success as the goal, the reasons for acquiring the necessary skills and training become obvious. The vocational teacher must look beyond his desk or workbench to the world of work. If a student shows an aptitude for woodcraft, what related jobs might he find interesting? The instructor can show that there are such occupations as wood patternmaking, cabinetmaking, and furniture design, as well as the old stand-by, carpentry, open to boys who find pleasure and show skill in woodwork.

The boys in the machine shop will find that the skillful use of machinery, such as, the drill press, the lathe, and the milling machine takes on greater importance with the knowledge that such processes help to develop the skills for jobs in toolmaking, metal patternmaking, designing, metallography, machine drafting, and research engineering.

Preparation for these and other skilled occupations require the student to have mechanical dexterity; an understanding of trade terms and material; ability to read blueprints; and to have a working knowledge of trades in general.

Recognizing the necessity for mastering trade skills facilitates individual and group learning; and once the taste of accomplishment in a technical skill has been experienced, the average student will move forward under his own steam to secure the additional training necessary to satisfy his personal ambitions and meet the requirements of the job he has chosen.

The job of protecting the youth from the hazards of wartime employment conditions and safeguarding the benefits of job training is mandatory. Adequate safeguarding involves more insight, study, and planning on the part of all adults. The vocational and industrial-arts teacher is especially well equipped to help prepare young people for the future when jobs will go to those with an appreciation for the worth of work, and who possess the right personality and technical skills. Workers with these requirements will be a lasting monument to their teachers, and workmen truly worthy of the sacrifices that have been made for them by our fighting men.

Choosing Your Textbook

*Amos G. Williams**

Usually sooner or later, in any teaching situation, an administrator, supervisor, or classroom instructor must select a basic textbook for the subject he teaches. To choose wisely implies that more discrimination is needed than for one to simply exercise a rule-of-thumb judgment. Most of us are prone to glance at a book and to leaf casually through its contents, noting the more obvious features of its appearance without taking into consideration the criteria on which a textbook's value is based.

Among the several factors one must consider are the following: (1) the binding construction employed, (2) the quality of the paper used, (3) the date of publication, (4) the table of contents, glossary of terms, and the index, (5) the quality of the illustrations used, (6) the number of illustrations used, (7) the typographic layout and printed composition, (8) the vocabulary and rhetoric used, (9) the adaptation of the content to your course, (10) the basic and related information that is presented, (11) the manipulative and operation units that are stressed, (12) the projects, plans, and specifications that are offered, (13) the sequence of the various learning units, (14) the questions for discussion that are included, (15) the reference bibliography listed, (16) the major divisions of the

(See page 348. Also evaluation scale, pages 346 and 347)

*Instructor, Department of Industrial Arts, Southeast Missouri State College, Cape Girardeau, Mo.

CHECK SHEET FOR TEXTBOOK RATING SCALE

Title of Book .....

Author or Authors .....

Publisher ..... Address .....

Price .....

Date of Publication ..... Edition .....

Classification (Manual, Workbook, Textbook, Reference Book) .....

No.	*Check Item*	*Poor* 0	1	*Good* 2	3	*Superior* 4	5
I.	Binding Construction						
II.	Quality of Paper						
III.	Date of Publication						
IV.	Table of Contents, Glossary, and Index						
V.	Quality of Illustrations						
VI.	Number of Illustrations						
VII.	Typographic Layout						
VIII.	Vocabulary and Rhetoric						
IX.	Adaptation to Course						
X.	Basic and Related Information						
XI.	Manipulative and Operational Units						
XII.	Projects, Plans, and Specifications						
XIII.	Sequence of Learning Units						
XIV.	Questions for Discussion						
XV.	Reference Bibliography						
XVI.	Divisions of Text						
XVII.	Numerical and Alphabetical Notation						
XVIII.	Technical Validity and Accuracy						
XIX.	Reliability of Content						
XX.	Cost						
Total Evaluation Score	Subtotals						

Condensed check sheet for textbook rating

THOSE VERSATILE ATOMS AND MOLECULES

We have heard of atom smashing and of the terrific havoc caused by the atomic bomb. No doubt that bomb helped a great deal in shortening this war; yet, every American, including those who helped to perfect this terrifying war missile, regrets, that such an inhuman weapon of war had to be used, and everyone feels that these bombs should be outlawed forever.

Yet, that same painstaking study in the research laboratory which produced the devastating atomic bomb is at work producing changes in the common substances with which the world is supplied so plentifully, and which, up to now, we have looked upon as almost worthless.

One of the most recent discoveries at the Westinghouse laboratories has produced a new family of substances called silicones. To produce them, common sand is treated with chemicals obtained from brine, coal, and petroleum. Then the molecules of the new substance are manipulated so as to produce a wide variety of custom-built materials to fit specific needs.

Already a liquid has been produced which remains perfectly fluid at 70° F. below zero; also a grease that does not melt at 400° F. Other members of the silicone family have been used to improve electrical insulation, produce heat-resistant paints for exhaust stacks, and hot-air ducts, as a polish for optical and other glass, as a foam stopper in lubricating oils, and as a moisture-proof coating for clothing and shoes.

The men who made and are making all of these epochal discoveries received their foundational training in the classroom, the school shop, and the school laboratory. Instructors should be proud of the men whom they have trained, and who, because of this training, have been able to work out such scientific miracles.

The teachers who have just started the school year 1945–46 should never lose sight of the fact that they are now preparing the men who must carry forward the work which the present miracle workers in scientific, chemical, mechanical, and electrical laboratories are producing. The teachers have an important job to fulfill. It is but justifiable pride if they look upon their work as being more important than that of almost any other profession, because if the teaching profession fails to educate our youth properly, the inevitable result will be the decadence of our entire civilization.

THE SHOP TEACHER'S SPECIAL JOB

When a student enters a new classroom in which any of the regular academic subjects are taught, he finds but few striking differences between the new room and the one which he had attended the previous semester or school year. It takes him but a short while to become acclimated, and he finds no difficulty in fitting himself into the general scheme.

What a different story it is, however, when he enters a school shop for the first time. He immediately notices a number of interesting tools, some of which he may have seen and handled at home. True, the tools in the school shop usually appear much nicer than those to be found in the average home toolbox, but they look familiar and the student may feel that he knows all about them. For that reason he may not be as careful in using them as he should be.

He forgets that in the school shop he is surrounded with edged tools that really have sharp edges. He must be cautioned against the dangers encountered in the use of these tools and he must be taught to observe safety precautions for his own sake as well as for the preservation of the tools.

Another thing worth remembering is that though the boy has used some of these tools, he may have used them in the wrong way. Examine the average chisel in the home tool kit and see whether it does not look as though it had been used as a screw driver, or as a cold chisel for cutting off wire nails, or for opening tin cans. But regardless of how familiar the tools may look to the boy, he still must be taught to use them correctly.

Start him off slowly, then, and take nothing for granted.

THE HARVARD COMMITTEE RECOMMENDATIONS

Dr. Paul H. Buck, dean of the faculty of arts and sciences at Harvard University, and 11 of his confreres, have just finished a two-year study of how to improve postwar high school and college education.

The recommendation of this committee points out that at least 50 per cent of the high school student's time be devoted to general education, emphasizing English, science, mathematics, and social sciences. These recommendations can well be followed even by the high school students who, in the upper years of the course, choose to follow rather specialized shop courses with the intention of entering a trade. The general conception of many educators that vocational education must be narrow is, of course, not true. Vocational schools, in an increasing number, are fortunately seeing their opportunity to give their offerings greater cultural values. Their English and history can be made as interesting to their students, and as broad in scope as are similar studies found in general high school courses now. Mathematics, of course, may be applied to specific vocational problems, but the mathematical principles will be the same, even if the problems pursue less abstract patterns.

It is well that high school courses are swinging back to embody more required work and less elective studies. This should not be an invitation to go back to the old formalism, but should rather be a challenge to educators to make the various branches such that they will thoroughly interest the student. In the past, there were teachers who could make students enthusiastic about Latin and Greek and even abstract mathematics. Why not train more of our teachers to become experts who know how to make their subjects real live challenges to their students.

When we have achieved that, there will be less need for defending our vocational offerings against those who charge narrowness to our more specialized courses.

FIRE PREVENTION WEEK

With the losses due to fires mounting from year to year, it is well that all schools participate wholeheartedly in the observance of *Fire Prevention Week* which has been scheduled this year for October 7–13.

Probably the subject of fire prevention can be presented nowhere with greater emphasis than can be done in the school shop.

Calling attention to and discussing fire loss statistics is not enough, however. We must do something about them if we want to take away from our land the unenviable reputation that we have the highest per capita fire loss of any country in the world.

Start in the school shop and see that adequate fire protection is provided.

EVALUATION RATING SCALE FOR TEXTBOOKS OF INDUSTRAL ARTS

Title of book ..... Author or authors .....

Publisher ..... Address .....

Price ..... Date of publication..... Edition.....

Classification (Manual, workbook, textbook, reference book).....

Directions: Each of the following twenty items is to be checked with a minimum rating of zero and a maximum rating of 5 per cent.

I. Binding Construction

The textbook does not have a durable cloth cover and/or the manual or workbook lacks a flexible or spiral binding

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The textbook has a durable cloth cover and/or the manual or workbook has a flexible or spiral binding.

II. Quality of Paper

The paper stock lacks a durable appearance. It has an inferior finish. A coarse, unbleached texture is evident.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The book has clear, well-finished paper stock. The surface is smooth, free of blemishes, and the stock appears to be durable.

III. Date of Publication

The textbook, manual, or workbook was published many years ago and is out of date with modern curriculum development.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The textbook, manual, or workbook is of recent publication and its content is in harmony with modern curriculum development.

IV. Table of Contents, Glossary, and Index

The table of contents is too brief and/or it has ambiguous page references. The glossary of terms and index are incomplete.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The table of contents is complete. Page references are easily noted. The glossary of terms and the index are practical and comprehensive.

V. Quality of Illustrations

The drawings, plans, or photographic illustrations are poorly executed and lack vital clearness. Colors are not harmonious.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The drawings, plans, or photographic illustrations are clearly executed to a convenient scale. Color schemes are tasteful and harmonious.

VI. Number of Illustrations

The illustrations are too few in number and/or they are too crowded. Many pages lack illustrations and/or some are confusingly cluttered.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The illustrations are distributed freely. Every learning unit has sufficient illustrations to motivate and maintain interest.

VII. Typographic Layout

Heads and subheads lack proportionate contrast and/or the type face is inconvenient for clear, rapid reading. Composition is crowded.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The type face is of convenient size for rapid reading. Heads and subheads have proportionate contrast to the sentences and paragraphs.

VIII. Vocabulary and Rhetoric

The grammar, sentence structure, and vocabulary are entirely unsuited to the class level. Lengthy, complex sentences are too frequent.

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The grammar, sentence structure, and vocabulary are well suited to the class level. Unity, coherence, and brevity are evident.

IX. Adaptation to Course

Too much of the textbook does not fit your specific subject nor is it well related to the state course of study for industrial arts.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

The content of the textbook is well related to your specific subject and to the state course of study for industrial arts. It is practical and adaptable.

X. Basic and Related Information

The textbook contains too much information not related to the specific subject. It is more suitable as a supplementary reference.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

The textbook contains information directly related to the subject. Concise brevity predominates, but much valuable information is presented.

XI. Manipulative and Operational Units

The textbook lacks a full, concise treatment of the operations needed. Manipulative techniques are explained vaguely.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

Individual operations are explained vividly and briefly in a manner easily understood. The operations are practical and relate directly to the subject.

XII. Projects, Plans, and Specifications

The book contains but a few projects applicable to the subject taught and/or it is concerned purely with information and operation units.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

The book contains many practical projects, plans, and specifications which supplement the subject in a direct interesting manner.

XIII. Sequence of Learning Units

The information and operation units are presented haphazardly. Their sequence is not consistent with a job analysis of the subject.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

The learning units are presented in a logical sequence consistent with a job analysis of the subject. First things come first.

XIV. Questions for Discussion

Questions for thought and discussion are not included at the end of each learning unit or textbook division.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

Practical questions for thought and analysis are included at the end of each learning unit or textbook division.

XV. Reference Bibliography

No contemporary references are listed in the book, either at the end of each learning unit or in a general appendix.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

A list of contemporary references is included at the end of each learning unit or in a general appendix.

XVI. Divisions of Text

The book has cumbersome chapter divisions. The learning units are too lengthy. The content of each lesson lacks unity, brevity, and coherence.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

The book has chapters and major divisions conveniently spaced for efficient study. Each lesson has unity, brevity, and coherence.

XVII. Numerical and Alphabetical Notation

Paragraphs, learning units, and illustrations are inconveniently labeled. Identification is ambiguous.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

Paragraphs, learning units, and illustrations are systematically labeled. The titles and figures can be easily noted.

XVIII. Technical Validity and Accuracy

Some of the operation units and/or information units are invalid with modern practice. Errors are evident. A poor job analysis.

POOR			GOOD		SUPERIOR
0	1	2	3	4	5

The content is technically up to date. Few errors are evident in the text or illustrations. The text reflects an accurate job analysis.

XIX. Reliability of Content

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The textbook is hastily organized to fill a temporary demand. Its usefulness is short lived and its permanent reliability is questionable.

The textbook is carefully organized for practical, long-lived utility. The principles are not likely to grow out of date in a short time.

XX. Cost

POOR		GOOD			SUPERIOR
0	1	2	3	4	5

The textbook is too expensive for your specific class use. Less expensive books of comparable utility are available.

The textbook is worth its price. It is a superior publication costing no more than textbooks of similar merit.

(Continued from page 344)

textbook, (17) the numerical or alphabetical notation used in identifying topics and illustrations, (18) the technical validity and accuracy of the text, (19) the long-term reliability of the text, and (20) the comparative cost of the book.

The foregoing items may not represent a complete list of the evaluation factors, but they are perhaps representative of the more obvious points of consideration. Many industrial-arts instructors, probably the majority of them, would consider it absolutely essential that a basic textbook include a selection of projects, plans, and specifications. Others might stress the desirability of the textbook's containing mainly explanatory units of hand-and-tool operations, or manipulative processes. Still other instructors might concern themselves with the number and profusion of the illustrations used. However, to place one's final selection of a textbook on a partially objective basis, it might be well to set forth, in the form of a convenient chart or *check sheet*, these separate factors.

The accompanying *"Evaluation Rating Scale for Textbooks of Industrial Arts"* is such an example. Twenty basic factors are considered. Using this scale, one may examine any prospective textbook, manual, or workbook of industrial arts and evaluate each of the twenty items on a percentage basis. It will be noted that both the desirable and the undesirable possibilities are described and charted on the scale, and that for each item evaluated a range of 0 to 1 per cent is *poor*, 2 to 3 per cent is *good*, and 4 to 5 per cent is *superior*.

In addition to the *"Evaluation Rating Scale,"* there has also been prepared an abbreviated individual *"Check Sheet"* to be used in lieu of the longer form. It lacks the detailed descriptions of the original rating scale. For convenience in publishing the check sheet precedes the evaluating rating scale.

On-The-Job Training as a Continuous Process

*R. B. Cribbs**

On-the-job training is a very important part of a training program; it takes place in the plant in the work area. Many times, in the past year, we have been asked the question, "Is there any place for training in postwar industry?" This question would seem to spring from a lack of understanding of the value and importance of training as a continuous process. Instead, it is thought of in terms of teaching a new person how to do a job, or just holding classes. When the job is learned and the class is over, training is completed. If we analyze the over-all objectives of training we can readily see that all types of training and, particularly on the job, must be continuous if we are to realize continuous benefits.

As we understand them, the over-all objectives are: (1) to develop individual efficiency as it relates to production, quality, cost, and safety, and (2) to promote and maintain positive attitudes in as many individuals as possible throughout the plant. Because of the fact that conditions and people are so changeable, it is imperative that our application be continuous.

Our on-the-job educational program establishes specific objectives which are designed with the understanding that attitude and efficiency do go together. These objectives are:

1. To organize training on a departmental basis and to assure supervision that all jobs are covered.
2. To assist each department, through education and training, in getting maximum production at minimum cost with minimum turnover and under safe conditions.
3. To assist supervision in maintaining the most co-operative and efficient possible work force.
4. To assure new people of individual consideration on their new assignments.
5. To determine if new people are forming positive attitudes in the first few weeks on the job.
6. To determine if older employees are forming and maintaining positive attitudes and,
7. To strengthen the production organization through developing the whole individual.

These objectives point the need for a substantial amount of personal contact and they are set up on certain basic beliefs about people. Our past experience has indicated to us that the following assumptions are valid:

The average person spends at least one third of his life at work and he desires a happy situation because it has a great deal of bearing on how he enjoys the balance of his time. Everything a man does has a meaning for him. It is obvious that this is no less true of his job. If the contact is pleasant, his attitude should be good, if it is unpleasant, it will probably be bad. Every single experience he has with his work environment (people and things) makes some impression on him.

Also, the individual employee wants recognition as an individual. The fact that each person has different interests, capacities, motivations, and feelings makes it imperative that he is so treated — particularly if we are going to be successful in controlling attitude.

He wants complete information about his job. His endeavor will have more meaning for him if he understands the whys, hows, and relationships. If he is given this consideration, we can look for gradual developments in over-all efficiency and we

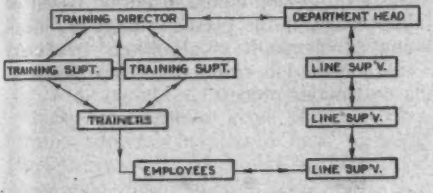
*Training Director, Wyman-Gordon Company, Ingalls-Shepard Division, Harvey, Ill.

might, if his attitude has been positively affected, get some ideas on new methods and job improvements.

If he has the opportunity to present and exchange such ideas a channel for obtaining additional recognition is open to him. We say additional because we feel that any time a man has any individual relationship with his supervisor he is being recognized. Failure to gain status in a work group can easily lead to frustration which, in turn, promotes negative attitude.

Organization

Since on-the-job training deals with individuals on all jobs throughout the plant, it is obvious that considerable organization and planning is necessary. We have found that an organization consisting of training directors, training supervisors, and several trainers, depending on the size of the company and departments, constitutes a practical arrangement for assisting supervision with their training job. Since attitude and efficiency have a direct bearing on production, supervision must carry the responsibility. The training department can help with the many details of the total program. In chart form our organization would look something like this:



Organization chart

It is apparent from the chart that the lines run both ways and that there are numerous opportunities for personal contact. The organization remains flexible enough to permit face to face discussions between any individual or any group of individuals. This use of the line and staff organization lends the control which is necessary in getting specific results from planned methods.

How to Use the Tools of On-the-Job Training

These methods provide a track on which supervision can function effectively with a minimum expenditure of time. Such procedures as induction, job instruction, follow-up, personal interviews, job breakdowns, timetables, personnel inventory, and shop records, are sometimes looked upon as individual projects and not understood as a workable part of a major plan. Our supervisors must understand the uses of these tools and they must feel that the objectives (individual efficiency and positive attitudes) must be achieved, otherwise, our "on-the-job" efforts will fall flat.

Tool 1. Induction

Normally, the first step in our on-the-job training is the group induction although, in some cases, it may be preceded by a brief pre-employment program in the local high school machine shop, or a plant vestibule school.

It is a well-known fact that an induction can be a dull, dry, monotonous procedure, particularly, if a person must sit for two or more hours to be drugged and lulled to sleep by a dead presentation of information. It is our feeling that an induction must be lively and full of participation by the group if any benefits are to be derived.

We attempt to hold interest through letting the inductee handle our products and safety equipment. If, through questioning, we can't get him talking, we feel that we haven't had a good induction. Our purpose is to put him at ease and to strengthen the assurance that he will get answers to any question which might be bothering him.

Charts and a plant movie will help stimulate discussion. We use a movie which takes the new person through the entire plant and illustrates all the beginner's jobs. He can see his work place and he can also visualize how his job fits into the total production pattern.

The new employee also has an opportunity to meet the staff department heads. These people explain their functions and how the employee can use them.

Production people attend these inductions regularly. We want them to know exactly what is taking place so that the on-the-job induction will be consistent in every respect.

We consider our group induction to be chiefly an ice breaker and we do expect to provide some background for a better understanding of the information he will get when he enters the department to which he has been assigned.

Procedures vary in different departments for the handling of new men. However, they are all alike in that the new person is assigned to a trainer immediately. The trainer has the responsibility of providing all helpful information; he also introduces the man to other supervisors and men; he conducts him through the department and explains the production flow and methods, and, he answers all questions on which he has full facts or he tells the men where he can get his answer.

Tool 2. Job Instruction

The trainer introduces the man to his job immediately after his shop orientation. The J.I.T. form of instruction is used very effectively and the trainer doesn't leave our new man until he is absolutely certain that he understands his operation. He also advises the new man as to where he can get all necessary tools and materials.

Tool 3. Job Instruction Follow-Up

The new man is not forgotten after he goes to work. The trainer is particularly interested in how effectively he is performing on the job and he checks back on the worker continuously after he has completed the instruction. He has a prepared list of questions for each operation. If the new man can answer these questions, and he seems to be doing okay, he has a working knowledge of his assignment. The man also has a further opportunity to ask questions about the job or company.

Tool 4. Department Head and Line Supervisor Interviews

Department supervision also talks to the new man soon after he goes to work. These contacts are, for the most part, *get-acquainted* interviews which are designed to discover the man's interests. This information, when shared, helps to promote the understanding we desire.

All these conversations assist in providing the groundwork for future general job contacts. If the supervisor can talk with an understanding of the worker's interests, ideas, and problems, he is in a more favorable position to discuss quality, cost, production, new job problems, safety, attitude, upgrading, plans, and the like. Our workers should be educated to understand these matters and *on-the-job* training cannot afford to overlook the possibilities involved.

Every one of these factors very definitely affect the continuous relationship between the supervisor and worker. Not a day goes by that the supervisor doesn't find it necessary to contact his men regarding some change. The employee needs to acquire a thinking instead of a feeling attitude toward these changes. If we are to lessen the chance of negative reaction, the supervisor must do everything he can to contribute to the worker's understanding through these discussions "on the job." The manner in which he contacts his people will be reflected in the degree of harmony in his department.

Proper interpretation of rules and regulations is a must. The *hows* and *whys* must be included somewhere in the supervisor's contacts with the worker. How many times have we seen a supervisor place himself *on the spot* through having to administer a punishment form of discipline? Wouldn't it be better to strive for the spontaneous type which is born of understanding and mutual respect?

Tool 5. Personnel Inventory

Our on-the-job training program provides for a personnel inventory every six months. At this time, the trainers and supervisors get together to analyze the individual performance of every man in the department. If each supervisor has maintained the proper relationship with the employee, he will be able to discuss his efficiency and attitude intelligently with the others. This sharing of facts enables supervision to develop a balanced understanding of the man being rated.

The supervisor talks with each man (old and new) away from the job when the personnel inventory is discussed. This is a personnel yardstick which, if properly used, can add real significance to our human relations and individual efficiency. The sensible purpose of the personnel inventory is to evaluate the strengths and weaknesses of the individual employee on a continuous basis. An up-to-date record, based on facts, makes it relatively easy for a supervisor to conduct a constructive, friendly interview which begins with the

outstanding phases of the man's performance and leads up to those on which the supervisor expects improvement. These interviews give our man an additional opportunity to talk about his job.

Tool 6. Job Changes and Retraining

It is essential that the supervisor be honest and impartial in his relationships with his men. It is just as important that these job contacts be maintained with the old timers in the department for they also should have recognition which these meetings furnish.

Further, these men may be scheduled to move up to a higher skilled job on which they will need to have adequate instruction, and, they may be falling into short-cut methods on the old ones. All of these conditions make us realize that *on-the-job* training must be continuous process.

Tool 7. Training Supervisor Interviews

The training supervisor interviews the new man some time during his first month on the job. His time is spent in determining whether or not the new person is making a proper adjustment on the job. He will ask such questions as: Do you know your supervisor? Did the department head talk with you? Have you had adequate instruction? Have you been advised on safe practices? Have rates, hours, and upgrade been explained to you? and, Is job what you expected it to be?

It isn't the purpose of the training department to spy on the production department; we want only to be sure that the individual thinks that he has been afforded the kind of treatment we feel sure that he appreciates. Usually, we get a very definite idea about the man's attitude — we watch for his volunteered comments on pay, supervision, environment, company, minor grievances, security, etc.

In talking to the older men, as he travels through the department, the training supervisor looks for similar attitudes on their part. In this way he gets in on the ground floor of trends in thinking by the men in the plant. Many times, he is able to help iron out minor gripes which might develop into a major problem.

Tool 8. Production, Cost, Safety, Personnel and Efficiency Records

Records are helpful in pointing out a need for on-the-job training. Low production, high cost, poor safety, high turnover, reduced efficiency, and high absenteeism reflect a need for more emphasis. If, for example, absenteeism is on the increase, some action should be taken. Our experience has proved to us that this problem cannot be controlled except through individual treatment. We use two records which help us to locate the problem. A monthly departmental report indicates by percentages where our major difficulty lies and each department maintains a record of the individual's absence. If we can trace our problem to three or four people, it is possible to assign a supervisor to the job of correcting the matter on a personal contact basis. This use of records lends a further reason for considering "on-the-job" training as a continuous process.

How the Supervisor Can Be Developed Through On-the-Job Training

The various procedures of our on-the-job training program present many practical opportunities for strengthening the supervisor on-the-job where it really matters.

The daily contacts with his men are invaluable because they provide firsthand experience in the human relations phase of his work.

Timetables and job breakdowns provide practice in planning. With a little guidance, the supervisor can realize advancement in this very essential phase of the job.

He can also get a clear picture of how records are established, how to interpret them, and how to use the information they contain in an effective manner. This is bound to give him a fuller appreciation of the importance of records in the industrial organization.

If the department head makes a real effort to plan and control these assignments, some very worth-while developmental results can be obtained. Certainly, all the schooling in the world won't help the supervisor unless he can acquire practice on the fundamentals of his job. And, to be effective, it must be continuous.

The supervisor is responsible for everything that goes on in his department. He is concerned about getting the most out of his machinery and equipment; he hopes to cut costs; he wants to reduce accidents; he desires to improve quality; and, he wants a co-operative group of workmen. He can't get all these results himself and the smart supervisor realizes it. If his people know that he is interested in them as human beings he is well on his way toward achieving a mutual understanding which will pay big dividends through helping him with the carrying out of his duties and responsibilities.

The purpose of our on-the-job training program then is to help the supervisor to realize that people are important and that only through his on-the-job leadership can they be developed to a high point of efficiency and enthusiasm; and, unless this development takes place, he will fail to achieve the production results he desires.

Since the supervisor can help himself most through personal contact, and since this requires individual attention based on knowledge of the person's interests, ideas, and problems, it is absolutely necessary that on-the-job training be considered as a continuous process.

Conference Training

*Lee Harris**

West Kentucky Coal Company officials — 20 of them — attended a training conference recently (Jan. 8–12) at Earlington, Ky., drew on their combined 567 years of experience and exchanged ideas for securing better team work and better understanding.

The conference was sponsored by the Madisonville Trade School, Madisonville, Ky., with Carl M. Polley as co-ordinator, and was made possible through the co-operation of the State Division of Vocational Education, with Dr. R. H. Woods as director.

One of the major problems discussed by the conference personnel was that of selling the employees interest in the company. Charles R. Crumpton, Department of Industrial Education, University of Kentucky, led this and all other discussions.

The mining officials listed the many advantages they believed the company offered the employees. They also listed ways in which information regarding these advantages could be conveyed to the employees. The group felt that some particular person or department should have charge of this information program.

Advantages the company offers the employees and ways of conveying this information to the employees were charted as follows:

Advantages to Employees

1. Stability of pay roll, employment, financial responsibility, and advancement
2. Fair treatment given
3. Top pay given employee
4. Maximum running time
5. Good working conditions
6. Social benefits such as hospitalization, group insurance, adequate bath houses, medical benefits, burial benefits, personal benefits including aid in all types of rationing, helpful advice, assistance with personal problems, assistance to employees' families
7. Progressive policies in relation to modern equipment for mining, modern equipment for preparation of mining, safety training, modern safety equipment, first aid, machine operation, training
8. Security for employees based on past performance of mines, unlimited coal reserves, progressive policies, favorable natural mining conditions, future planning to maintain increased production
9. Good local public relations
10. Establish selling policies in regard to future sales, maintaining reputation of product and service, maintenance of stand-

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ards and competitive position, future markers, sales service and research, reserves of coal adaptable to special preparation and purposes, broad and varied market outlets, maintaining an adequate selling department, well-planned and established advertising system

11. Establish buying policy so that adequate supplies of materials and repair parts are maintained, safe operating conditions are maintained, minimum loss of time occurs, advantageous contacts are maintained, reciprocal business is encouraged

12. For international reputation have good publicity and a source of new ideas

13. Have a good location accessible to public; large marketing area, good roads, U. S. main highways, north and south, on trunk line of north and south railroad, low-rent area, favorable building locations, good community, good churches, good schools

14. Recreational facilities should include hunting, fishing, golf, bowling, swimming, basketball, football, and other sports.

Getting Information to Employees

1. Management should maintain proper attitude

2. Personal contacts should be stressed

3. Proper selling of group leaders and keymen by use of conference methods and planned meetings

4. Company sponsored publications in which are featured good pictures, illustrated progress in picture form, personal items, items of commendation, bits of information, by-products of coal

5. Social activities

6. Radio programs of the following nature: quiz programs, interviews, round-table discussions, romance of coal, by-products of coal, future of coal

7. Moving pictures, sound and silent

8. Trips through mines

9. Vocational training

10. Posters and bulletins

11. Place definite responsibility in some department

12. Newspapers, by means of personal interest stories, pictures, new developments, general information concerning the coal industry.

Also charted were the recommendations of the group regarding ways to secure co-operation among employees. Findings of the group on this subject follow:

Cause of Poor Co-operation: (1) misunderstanding, (2) indifference, (3) lack of information, (4) violation of policies, (5) incompetence, (6) misfits, (7) dissatisfaction, (8) old grievances, (9) imaginary grievances, (10) poorly expressed orders, (11) lack of confidence in other people, (12) lack of self-confidence, (13) poor leadership, (14) lack of ability, (15) fear, in relation to: failure, superiors, physical setup, criticism.

Evidence of Lack of Co-operation: (1) failure to accept job, (2) absenteeism, (3) waste, (4) carelessness, (5) failure to observe rules, (6) disregarding orders, (7) drop in efficiency, (8) drop in interest, (9) delays.

How to Secure Co-operation: (1) better understanding, (2) inventory yourself for weaknesses, (3) exchange of ideas, (4) recognition of other person's ideas, (5) offer encouragement, (6) prompt and satisfactory settlement of grievances, (7) be fair and honest in all your dealings, (8) carefully weigh all the evidence, (9) gain confidence in your men, (10) give proper instruction, (11) give full information, (12) take time to listen to grievances, (13) make proper placement, (14) develop morale, (15) develop competitive spirit, (16) encourage initiative, (17) create personal interest.

Transportation was recognized by the conference personnel as the major factor in keeping workers from their jobs. Causes of absenteeism and ways absenteeism can be combated are listed in table below.

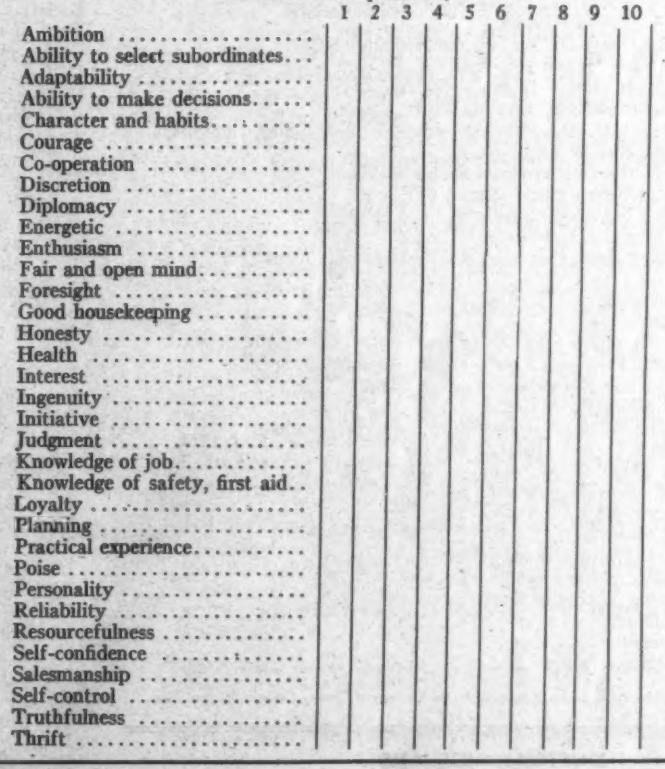
Much time was devoted to discussing the characteristics of a satisfactory foreman. The group listed 34 characteristics to be desired in every foreman. A measuring scale of zero to 10 was set up, with perfection in any characteristic being 10. Thus, a foreman's characteristics could be translated into graph form.

In this way, comparison and selection of foremen was made easier. The characteristic graph is shown below.

Causes of absenteeism	*Per cent*	*Ways to combat absenteeism*
1. Transportation	45	1. Place a board at entrance of mines; put names of boys in service on it
a) Old cars		2. Write occasional letters to employees
b) Inadequate garage service		3. Make an honor roll for attendance
c) Drivers out		4. Give other attendance recognition
2. Pay day		5. Establish physical check-up policy
3. Order day	20	6. Install effective form of discipline
4. Drinking and gambling	10	7. Arrange for playing of patriotic records
5. Alarm-clock shortage	2	8. Establish a system of effective poster making, for example:
6. Sickness	15	Do you have someone in service?
a) Workers		Did you work the last shift?
b) Members of family		
7. Members of armed forces home on furlough	2	
8. Exhaustion	2	
9. Indifference	2	
10. Miscellaneous cases	2	

Foreman's Characteristics Graph

(Conference personnel made no attempt to list characteristics in order of importance)



Teaching Materials for Industrial Education

*Chris H. Groneman**

(*Continued from page 254 of the June, 1945, issue*)

Films

The following list of teaching aids was collated to help the teachers of the various departments of industrial arts and vocational education.

It is advisable that teachers use school stationery when writing for any of the films listed. Films should be ordered well in advance — several weeks' notice would be desirable. In ordering films it is best to mention a second and third choice in case the first selection cannot be furnished at once. The size of the film should be specified, and the desired date must be given; also an alternate date, if possible.

Prompt return of films is essential to assure available prints for the next exhibitor. A 16mm. sound print must be projected only on 16mm. sound projectors. Projection on a silent machine will ruin the film for all future use.

All films are free unless otherwise noted. Transportation charges must be met in every case. The borrower is required to pay for any loss or damage done to the films in his possession. Where a loan fee is requested, that fee should be included with the order to save time and correspondence concerning this.

Transportation (Cont'd.)

Canadian National Railways, Motion Picture Library, Montreal, Can.
- Alaska and the Yukon—40 min.—Sound
- Canadian Rockies Holiday—42 min.—Sound
- Columbia Icefield Highway—25 min.—Sound
- Gaspe Tour—20 min.—Sound
- Hinterland Trout—12 min.—Sound
- Jasper Diary—50 min.—Sound
- Minaki Melody—28 min.—Sound
- Romantic Jasper—12 min.—Sound
- Roof of the World—12 min.—Sound
- Snowtime—30 min.—Sound
- Trail of the Great Divide—20 min.—Sound
- Triangle Tour—35 min.—Sound
- Wings to Your Heels—16 min.—Sound

Canadian Pacific Railway Co., Montreal, Canada.
- From Coast to Coast (3 reels—color)—30 min.—Sound or Silent
- Quebec and the Maritimes
- Ski-Time in the Laurentians—Sound or Silent
- Ski Trails of New France—Sound or Silent
- Snow Hills of Quebec (1 reel—color)—Silent
- The Maritimes (1 reel—color)—Silent
- Winter Playground (1 reel—color)—Sound or Silent
- Niagara
- Inland Voyaging
- Summer Idyll
- Canadian Mountain Summer (1 reel—color)—Sound or Silent
- The Radiant Rockies (2 reels—color)—Sound or Silent
- Ski Time in the Rockies—Sound or Silent
- Canadian Mountain Majesty
- Color in the West (2 reels)—Silent; (1 reel)—Sound
- Riding High (1 reel—color)—Silent
- Skis Over Skoki (1 reel—color)—Silent
- Top of the World—Sound or Silent
- Way Up and Back
- Sky Line Motoring
- Climbing Up Into Canada's Past
- Indian Days in the Canadian Rockies
- Pow-Wowing With the Kootenays
- The Pathfinder
- Mountaineering by Canoe
- The Evergreen Island
- Totem Land
- Alaska and the Yukon (1 reel—color)—Sound or Silent
- Fish and Medicine Men
- Saving the Sagas
- Hook, Line, and Sinker
- Kawartha Muskeys
- Sporting Waters
- The Fishing Parson
- They're Biting Good
- Gatineau Bass
- The Spy of Nictau
- A Mooseback on the Miramichi
- Wild and Wet
- Trophies of a Screen Chase
- Tobique Secrets
- The Happy Hunting Ground
- Around Snowdonia
- The Country of the White Rose
- Old Sussex
- Looking at London
- Somerset Idyll
- Land of Ancestral Gods
- Shanghai, Hangchow, and Nanking
- China's Forbidden City
- Pidgin Land
- Bombay
- Mystic India
- The Miracle of a Locomotive
- The Story of a "Duchess"
- Trail Riding Through the Clouds (2 reels—color)—Silent
- Hiking on Top of the World (1 reel—color)—Silent

Chicago, Milwaukee, St. Paul & Pacific Railroad, 516 W. Jackson Blvd., Chicago 6, Ill.
- Over the Mountains to the Pacific—10 min.—35mm.—Sound
- Puget Sound Playgrounds—10 min.—35mm.—Sound
- Gallatin Gateway to Yellowstone—10 min.—35mm.—Sound
- Trail of the Olympian—23 min.—16mm.—Sound
- Olympian Wonderlands—22 min.—16mm.—Sound
- Gallatin Gateway Honeymoon—25 min.—16mm.—Sound
- Westward to the Sea—20 min.—16mm.—Sound

Curtiss-Wright Corp., Airplane Division, Buffalo Plants, Buffalo, N. Y.
- Curtiss-Wright Answers the Call for Quantity—23 min.—16mm.—Sound
- Victory in the Air—10 min.—16mm.—Sound
- America First in the Air—23 min.—16mm.—Sound
- Wright Builds for Air Supremacy—25 min.—16mm.—Sound

General Motors Corp., Dept. of Public Relations, Broadway at 57th St., New York 19, N. Y.
- Along the Great Silk Route—30 min.—16 and 35mm.—Sound
- America Can Give It—40 min.—16 and 35mm.—Sound
- Around the World With G.M.—18 min.—16 and 35mm.—Sound
- Caravan—30 min.—16mm.—Sound
- Caught Mapping—10 min.—16 and 35mm.—Sound
- Communique From Middletown—40 min.—16mm.—Sound
- Diesel, the Modern Power—25 min.—16 and 35mm.—Sound
- Diesels Working on the Railroads—12 min.—16 and 35mm.—Sound
- Frontiers of the Future—11 min.—16 and 35mm.—Sound
- Futurama—10 min.—16mm.—Sound
- The Glass Case—20 min.—16mm.—Sound
- How Not to Conduct a Meeting—10 min.—16 and 35mm.—Sound
- India—20 min.—16 and 35mm.—Sound
- It's Up to Us—10 min.—16 and 35mm.—Sound
- King Cotton—19 min.—16 and 35mm.—Sound
- Lest We Forget—10 min.—16 and 35mm.—Sound
- Magic in the Air—10 min.—16 and 35 mm.—Sound
- Modes and Motors—9 min.—16 and 35mm.—Sound
- On to Jupiter—20 min.—16 and 35mm.—Sound
- On Top of the World—9 min.—16 and 35mm.—Sound
- Precisely So—20 min.—16mm.—Sound
- Remote Control—10 min.—16 and 35mm.—Sound
- Sand and Flame—21 min.—16 and 35mm.—Sound
- Science in Business—16 min.—16mm.—Sound

*Industrial Education Department, A. & M. College of Texas, College Station, Tex.

Singing Wheels—24 min.—16mm.—Sound
They Also Fight—18 min.—16mm.—Sound
General Motors War Products Training Film—18 min.—16mm.—Sound
To New Horizons—24 min.—16 and 35mm.—Sound
This Is Your War—3 min.—16 and 35 mm.—Sound
Victory Is Our Business—10 min.—16 and 35mm.—Sound
Where Mileage Begins—19 min.—16 and 35mm.—Sound or Silent
Formations—9 min.—16 and 35mm.—Sound or Silent
Man on Horseback—10 min.—16 and 35mm.—Sound
On Two Wheels—14 min.—16 and 35mm.—Sound
The Other Fellow—9 min.—16 and 35mm.—Sound
Safe Roads—8 min.—16 and 35mm.—Sound
Safety Patrol—10 min.—16 and 35mm.—Sound
The Tip-Off—9 min.—16 and 35mm.—Sound
We Drivers—10 min.—16mm. (black and white); 35mm. (partly technicolor)—Sound or Silent
The Boss Takes His Coat Off—30 min.—16 and 35mm.—Sound
Progress Report—22 min.—Sound
Working Together—23 min.—Sound
How to Remember Names and Faces—30 min.—16mm.—Sound
Selling America—33 min.—16 and 35mm.—Sound
(General Motors films available to schools.)

Goodyear Tire & Rubber Co., Inc., Motion Picture Dept., Akron, Ohio.
Conquering the Jungle (1 reel)—15 min.—16 and 35mm.—Silent; also 16mm.—Sound
Conquering the Desert (2 reels)—30 min.—16 and 35mm.—Silent
Modern Coal Mining (2 reels)—25 min.—16 and 35mm.—Silent; also 16mm.—Sound
The Island of Yesterday (1 reel)—15 min.—16 and 35mm.—Silent
Men in the Making (1 reel)—15 min.—16 and 35mm.—Silent
Trails of Camp Manatoc (2 reels)—30 min.—16 and 35mm.—Silent; also 16mm.—Sound
The Story of the Airship (1 reel)—15 min.—16 and 35mm.—Silent; also 16mm.—Sound
Lightning-Proof (1 reel)—15 min.—16 and 35mm.—Silent
Magellan of the Air (1 reel)—15 min.—16 and 35mm.—Silent
Great Airship Dock (1 reel)—15 min.—16 and 35mm.—Silent
The Story of the Tire (2 reels)—30 min.—16 and 35mm.—Silent; also 16mm.—Sound
Cushioned Landings (1 reel)—15 min.—16 and 35mm.—Silent
Parade of Comic Balloons (1 reel)—15 min.—16 and 35mm.—Silent; also 16mm.—Sound
Girdling the Globe (1 reel)—15 min.—16mm.—Silent
Arizona (1 reel)—15 min.—16 and 35mm.—Silent
The U. S. S. Akron (2 reels)—30 min.—16 and 35mm.—Silent
Balloon Racing (1 reel)—15 min.—16 and 35mm.—Silent
When Industry Plays (1 reel)—15 min.—16 and 35mm.—Silent; also 16mm.—Sound
The Air Fleet (1 reel)—15 min.—16 and 35mm.—Silent
One-Point Landings (1 reel)—15 min.—16 and 35mm.—Silent
Thrills and Spills (1 reel)—15 min.—16 and 35mm.—Silent
The Inner Tube (1 reel)—15 min.—16 and 35mm.—Silent
The World's Fair (2 reels)—30 min.—16 and 35mm.—Silent
Trail of the Jack Pines (1 reel)—15 min.—16 and 35mm.—Silent
Fighting the Dust (1 reel)—15 min.—16 and 35mm.—Silent
Santa at Goodyear (1 reel)—15 min.—16 and 35mm.—Silent
The U. S. S. Macon (2 reels)—30 min.—16 and 35mm.—Silent
Great Lakes Exposition (1 reel)—15 min.—16 and 35mm.—Silent
Motorcycling on Parade (1 reel)—15 min.—16 and 35mm.—Silent
Future Farmers (2 reels)—30 min.—16 and 35mm.—Silent

Illinois Central System, 135 East 11th Place, Chicago, Ill.
Along the Ol' Mississippi (2 reels—color)—Sound
Fascinating Florida (1 reel—color)—Silent
Mardi Gras at New Orleans (1 reel—color)—Silent
Romantic Mexico (2 reels—color)—Sound
Vignettes of New Orleans and the Mississippi Gulf Coast (2 reels—color)—Sound
A Visit to the Abraham Lincoln Country in Illinois (1 reel—color)—Silent

Lockheed Aircraft Corp., 1705 Victory Place, Burbank, Calif.
The Lightning P-38 (color)—12 min.—16mm.—Sound—(Free)
The Worm's Turn—35mm.—Sound—(Charge)
To Bee or Not to Bee—35mm.—Sound—(Charge)
Material Handling—35mm.—Sound—(Charge)
An Engine Change on the P-38—35 mm.—Silent—(Charge)
The Interceptor Pursuit P-38—35mm.—Sound—(Charge)
Metal Drawings—35mm.—Sound—(Charge)

New York Central System, 466 Lexington Ave., New York, N. Y.
The Freight Yard (2 reels)—22 min.—Sound
New York Calling (2 reels)—22 min.—Sound
The Steam Locomotive (2 reels)—22 min.—Sound

Norfolk & Western Railway, Roanoke, Va.
The Power Behind the Nation (color)—34 min.—Sound

The Pennsylvania State College, State College, Pa.
The Construction of Light Airplane—28 min.—16mm.—Sound—(Rental or Sale)
Drafting Tips—28 min.—16mm.—Sound—(Rental or Sale)
Baby Care-Feeding—23 min.—16mm.—Sound—(Rental or Sale)

Shell Oil Co., 50 West 50th St., New York 20, N. Y.
Flight Log—23 min.—16mm.—Sound
Oil From the Earth—18 min.—16mm.—Sound
Oil for Aladdin's Lamp—28 min.—16mm.—Sound
Pipeline—17 min.—16mm.—Sound
10,000 Feet Deep—20 min.—16mm.—Sound

United Air Lines, Dept. of School and College Service, Palmer House, Room 305, Chicago 3, Ill.
(Make requests to the Society for Visual Education, 100 East Ohio St., Chicago 11, Ill.)
Air Transportation—Behind the Scenes of a Coast to Coast Flight—with accompanying teacher's manual—35mm.—Slide Film

Wright Aeronautical Corp., Division of Curtiss-Wright Corp., Paterson 3, N. J.
Wright Builds for Air Supremacy—16mm.—Sound
Cyclone Combustion—35 min.—16mm.—Sound

Woods

American Forest Products Industries, Inc., 1319 18th St., N.W., Washington 6, D. C.
Trees for Tomorrow—18 min.—16 and 35mm.—Sound
Over Pine Mountain Trails—25 min.—16mm.—Sound
(Available from Dierks Lumber & Coal Co., 1006 Grand Ave., Kansas City 6, Mo.)
(The following motion pictures are available from Douglas Fir Plywood Association: 301 Tacoma Bldg., Tacoma, Wash.; 701 Cogswell Road, El Monte, Calif.; 1707 Daily News Bldg., Chicago, Ill.; 205 East 42nd St., New York City.)
Miracle in Wood[7] (color)—35 min.—16mm.—Sound
The Plywood Fleet (color)—35 min.—16mm.—Sound
Prefabrication With Plywood (color)—32 min.—16mm.—Sound
The Doorway to Happiness (color)—30 min.—16mm.—Sound
Farm Uses for Plywood (color)—30 min.—16mm.—Sound
How to Finish Plywood (color)—22 min.—16mm.—Sound
Forest Treasures—25 min.—16mm.—Sound
(Available from The Veneer Association, 616 So. Michigan Ave., Chicago, Ill.)
(The following are available from Western Pine Association, 510 Yeon Bldg., Portland 4, Ore.)
Harvesting the Western Pines—30 min.—16mm.—Sound
Fabricating the Western Pines—35 min.—16mm.—Sound
Building a Home With Western Pine—25 min.—16mm.—Sound
(The following are available from Weyerhaeuser Sales Co., First National Bank Bldg., St. Paul, Minn.; P.O. Box 629, Newark, N. J.; and Tacoma Bldg., Tacoma, Wash.)
Trees and Men—16mm.—Sound; 40 min. or 35mm.—Sound; 10 or 40-minute versions
Trees and Homes—30 min.—16 and 35mm.—Sound (Technicolor)

American Walnut Manufacturers Association, 616 South Michigan Ave., Chicago, Ill.
American Walnut (color)—22 min.—16mm.—Sound

The Chicago Tribune, Public Service Office, 435 No. Michigan Ave., Chicago, Ill.
Trees to Tribunes—25 min.—16mm.—Sound
The All-American Way—25 min.—16mm.—Sound
Music for Americans—18 min.—16mm.—Sound

Douglas Fir Plywood Association, Tacoma, Wash.
How to Finish Plywood (color)—22 min.—Sound
The Plywood Fleet (color)—35 min.—Sound
How to Sell Plywood (color)—16 min.—Sound
Prefabrication With Plywood (color)—32 min.—Sound
Miracle in Wood (color)—35 min.—Sound
Farm Uses for Plywood (color)—30 min.—Sound
The Doorway to Happiness (color)—30 min.—Sound

Homasote Company, Trenton 3, N. J.
A City Comes to Alexander's Corners (color)—90 min.—16mm.—Sound
How to Build a House in 78 Minutes (color)—30 min.—16mm.—Sound
A City Rises Overnight (color)—60 min.—16mm.—Sound (Film Catalog)

[7]This film may also be obtained by writing the YMCA Motion Picture Bureau at: 347 Madison Ave., New York City; 1700 Patterson Ave., Dallas, Tex.; 19 South LaSalle St., Chicago, Ill.; and 351 Turk St. San Francisco, Calif.

S. C. Johnson & Sons, Inc., Racine, Wis.
Beauty for Keeps—30 min.—16mm.—Sound
Mahogany Association, Inc., 75 E. Wacker Drive, Chicago 1, Ill.
Masterpiece in Mahogany—30 min.—16mm.—Silent
The Romance of Mahogany—45 min. and 30 min. versions—16mm.—Silent
United States Department of Agriculture, Office of Information, Washington, D. C.
Applications from the following states should be addressed to the institutions indicated. Applications from states not listed should be addressed to the Motion Pictures Section, Extension Service, United States Department of Agriculture, Washington, D. C.
Arizona. Extension Division, University of Arizona, Tucson; also Extension Division, University of California, Los Angeles.
California. Extension Division, University of California, Berkeley (serves Northern California). Extension Division, University of California, 815 South Hill St., Los Angeles (serves southern California).
Colorado. Bureau of Visual Instruction, University of Colorado, Boulder.
Florida. Department of Visual Instruction, General Extension Division, University of Florida, Gainesville.
Georgia. Division of General Extension, University System of Georgia, 223 Walton St., N.W., Atlanta.
Idaho. Department of Visual Instruction, Oregon Agricultural College, Corvallis.
Illinois. Visual Aids Service, University of Illinois, Champaign.
Indiana. Bureau of Visual Instruction, Extension Division, Indiana University, Bloomington.
Iowa. Visual Instruction Service, Iowa State College, Ames.
Kansas. Bureau of Visual Instruction, University Extension Division, University of Kansas, Lawrence.
Kentucky. Department of Visual Aids, University of Kentucky, Lexington.
Michigan. Extension Service, University of Michigan, Ann Arbor; also, Extension Service, Michigan State College, East Lansing.
Montana. Department of Visual Instruction, Oregon Agricultural College, Corvallis.
Nebraska. Extension Division, University of Nebraska, Lincoln.
Nevada. Extension Division, University of California, Berkeley.
New Hampshire. Extension Service, University of New Hampshire, Durham.
New Jersey. New Jersey State Museum, Statehouse Annex, Trenton.
(To be continued)

An Explanation of Gravure

*Lieut. R. Randolph Karch, U.S.N.R.**

Gravure is called by many names: photogravure, color gravure, rotogravure, and the like. Newspapers use the process for Sunday picture supplements. Magazines use it for certain picture sections of their issues, and often use the process exclusively for printing the entire edition. Other uses for gravure include wallpaper, textiles, wrapping paper designs, linoleum, oilcloth, cellophane wrappers, greeting cards, mail order catalogs, and art subjects.

Rotary gravure press speeds are great, as the cylinders travel at a speed of 16,000 revolutions per minute. A press will turn out about 32,000 newspaper supplements each hour.

Paper used for gravure is smooth and absorptive, and has no glare.

Gravure ink is extremely fast drying, because the paper travels through the press at about 1,000 feet per minute. The ink is highly volatile.

For colorgravure, the press has a separate cylinder for each color — usually red, yellow, blue, and brown (or blue and black). The combinations of these colors make the beautiful tones apparent in gravure work.

Step 1 — The Carbon Tissue Is Exposed

The carbon tissue is printed with a screen, usually 150 lines to the inch. Upon exposure to a positive film, the gelatin-sensitized coating of the carbon tissue hardens in proportion to the amount of light which comes through the film. The gelatin is hardened to the least degree in the shadow areas; to a lesser degree in the middle tones, and to the greatest degree in the high-light areas. The gelatin remains soft where the lines of the screen appear. See Figure 1.

*Training Literature Field Unit No. 1, New York City.

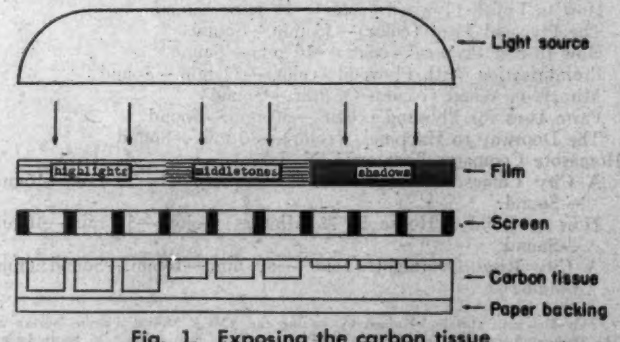


Fig. 1. Exposing the carbon tissue

Step 2 — Carbon Tissue Is Placed on the Cylinder

The carbon tissue is squeegeed onto the copper cylinder which will print the paper. See Figure 2. After a job is printed, the copper cylinder is turned down in a lathe to remove the old and now unwanted etched-out image. Then, by the electrolytic process, more copper is deposited on the cylinder, which is again turned down to the correct size.

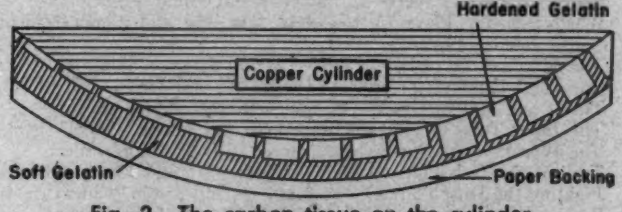


Fig. 2. The carbon tissue on the cylinder

Step 3 — Cylinder Is Developed

The paper backing and the soft gelatin of the carbon tissue is washed off, leaving the light-hardened gelatin on the copper cylinder. This leaves a multitude of little gelatin squares of varying heights. Parts of the cylinder not to be etched are painted with asphaltum, which resists the etching acid. See Figure 3.

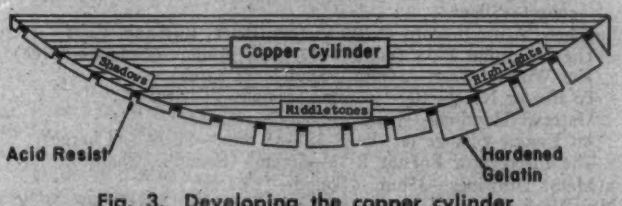


Fig. 3. Developing the copper cylinder

Step 4 — Cylinder Is Etched

The cylinder is etched several times. The acid must penetrate the little squares of gelatin before it starts to eat away at the

cylinder. The shadows are etched deeper than other areas, because the acid has further to go through the larger block of gelatin. The etching is done first on the shadows, then middle tones, and last the high lights. See Figure 4.

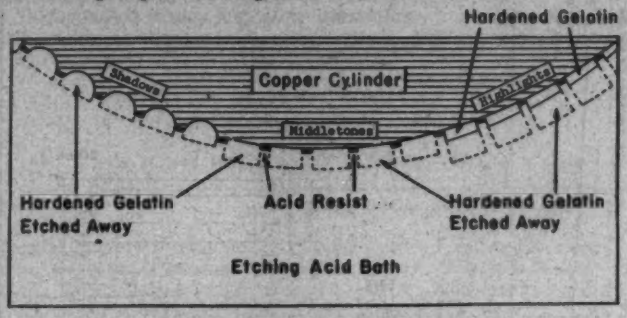


Fig. 4. Etching the cylinder

Step 5 — Cylinder Is Placed on the Press

The completed copper cylinder consists of thousands of little square cells which have been eaten out of the plate by the acid. The shadow cells deposit the most ink because more ink is contained in these deeper cells. See Figure 5. The middle-tone cells deposit less ink than the shadows, and the high-light cells, containing the least amount of ink because they are less deep than the others, deposit the least amount of ink. The ink spreads slightly when it contacts the paper, and the screen is thus partially obliterated.

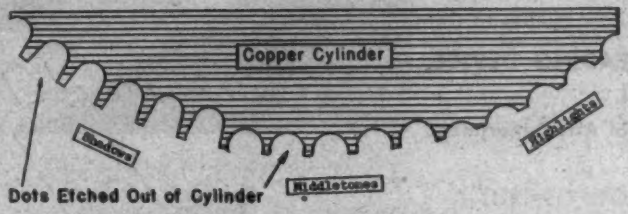


Fig. 5. Cylinder ready to be placed

How a Gravure Press Operates

Modern gravure presses operate on the rotary principle, and the paper passes through the press in web form — that is, from a roll — around the impression cylinder. The paper, after being printed, may be cut into sheets, folded into newspaper supplements, or rewound for further processing. Color gravure presses usually have four or five cylinders.

An inking roller, turning in an ink reservoir, places ink directly on the copper cylinder, and the ink penetrates into the small cells which have the design etched out. As shown in Figure 6, the doctor blade scrapes all ink from the smooth portions of the cylinder, leaving the ink only in the small cells. Upon contact with the paper, the ink leaves the cells and adheres to the paper. The ink spreads, and tends to obliterate the screen pattern. The ink is also fast drying.

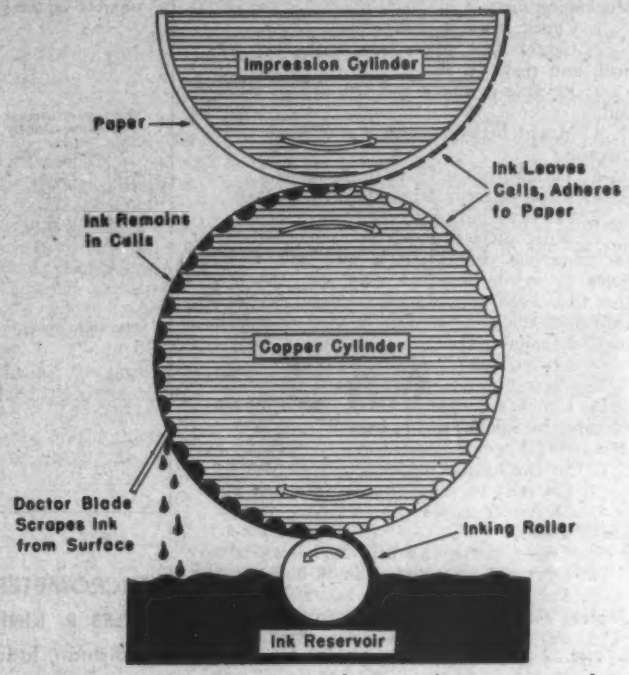


Fig. 6. A schematic picture showing the operation of the gravure press

Copperplate and steelplate engraving is on the same intaglio principle, with the exception that heavy ink is used, and the plates are flat. The resultant ink impression stands up above the surface of the paper, and can be easily felt with the finger. Paper currency is printed by the intaglio process, using a special ink. This is a special form of *engraving*.

Problems and Projects

GETTYSBURG CANNON

GEORGE F. LARTZ
High School
Frederick, Md.

A machine-shop project with high interest and pupil appeal will be found in this model of an old muzzle-loader Civil War cannon shown in Figures 1 and 2, the original of which is preserved on the Gettysburg, Pa., battleground. Of course, these Civil War guns were mounted on wagon wheels the making of which are out of the machine-shop line, so a sturdy angle steel mount was substituted. The original cannon is made of brass, but since this stock is hard to secure a piece of cold rolled steel, old auto axle, or drive shaft will suffice. Fastened to a ¾ by 3½ by 6½-in. base of walnut, highly polished with brass nameplate and piled balls, this model will hold the attention of any older boy in the advanced machine-shop class, as well as enhance the home mantlepiece. The cannon when carefully made will actually fire balls from any old 5/16-in. ball bearing race from the junk yard. The boy must understand that caution must be exercised in loading, however, not to overcharge. Powder from four ¼-in. firecrackers is sufficient and a fuse of at least 1½ in. should be used. The model which

Fig. 1

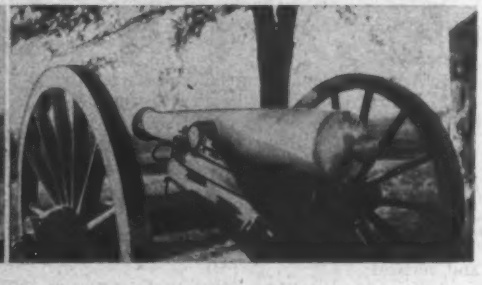


Fig. 2

appears in Figure 3 was made of brass by a high school senior boy, and the following general steps are used in working up this job:

Machining Trunnions:

1. Mount short scrap stock in chuck or collet
2. Turn to dimensions, polish, cut off
3. Reverse stock, face, polish
4. Set aside to press in barrel later

Machining Barrel:

1. Chuck stock in independent chuck
2. Center drill, make bore with long set drill, and ream to size
3. Reverse in chuck and center drill other end.
4. Mount between centers and rough turn cascabel
5. Turn barrel to 15/16-in. diameter
6. Reverse, form flared muzzle, and face
7. Set over tailstock and turn taper
8. With surface gauge lay out positions for trunnions, center punch, and drill 3/8-in. holes 1/8 in. deep with a drill that has lips that have been ground to an angle of 80 deg., instead of the usual 59 deg. To start this drill, make a shallow 1/4-in pilot hole first.
9. Center punch and drill fuse hole
10. Press trunnion pins in place
11. Chuck in universal chuck, round up the cascabel, and polish highly overall

Machining Cannon Mount:

1. Cut two lengths angle steel from bar
2. Lay out to dimensions and rough cut
3. Mount in shaper vise and make angular cuts to size.
4. Center punch and drill all holes
5. Draw file edges and clean off burrs
6. Paint with flat black

Making Base (Woodwork Department):

1. Cut base of walnut (or other hardwood) to size — 3/4 by 3 1/2 by 6 1/2 in.
2. Cut chamfers
3. Lay out and drill shallow spots for three 5/16-in. balls
4. Lay out and drill 7/32-in. holes for fastening cannon mount
5. Sand smooth, coat with lacquer, polish with wax
6. Cut a strip of 20-gauge brass 1/2 by 3 in., and stamp *Gettysburg Cannon* on it. Polish this plate and fasten it to the base with escutcheon pins

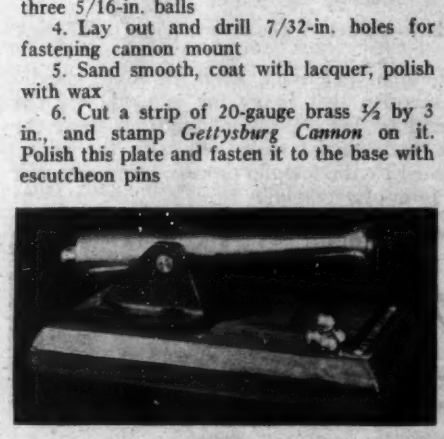


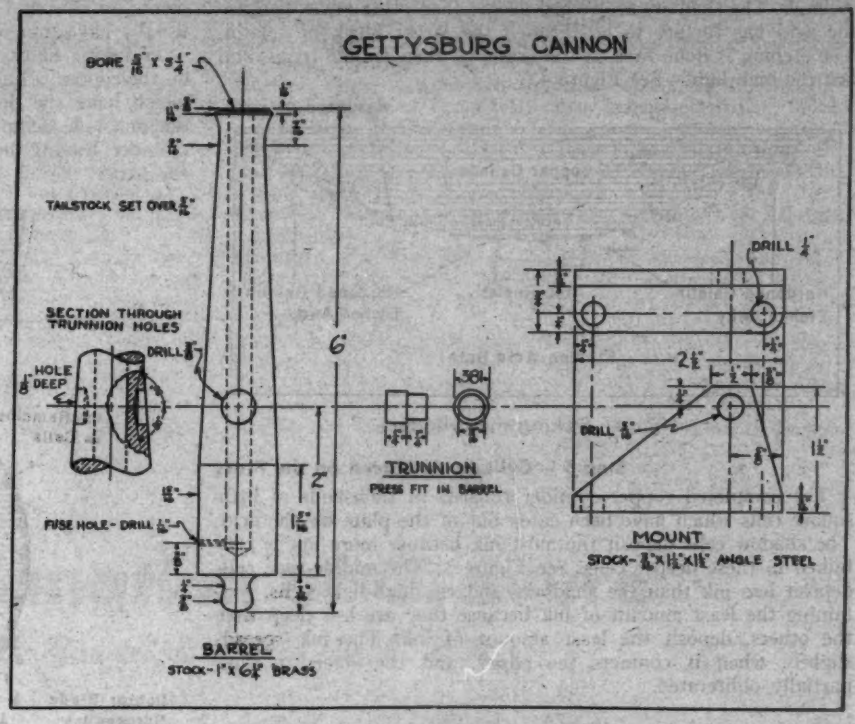
Fig. 3

Assembly:

1. Assemble cannon mount and barrel
2. Fasten cannon to base with four 1/4 by 1-in. lag screws
3. Pile four 5/16-in. balls in position
4. Turn in for instructor's inspection

Final Check:

1. Is cannon bore smooth?
2. Is fuse hole drilled in proper position?
3. Are trunnion pins in line — horizontal and vertical?
4. Is cannon and base highly polished?
5. Does flared end of muzzle meet taper smoothly?
6. Is cascabel prefectly smooth?



Details of Gettysburg cannon

A MICROMETER READING DEVICE

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Athens, Ohio

During the past two or three years it has been necessary to train numbers of men and women to do precision work in the many war industries of our nation. In many cases the people who have received this training have had a minimum of general education, and as a consequence devices for training which these people can understand have been devised by the persons responsible for their training.

Charts, slide films, and moving pictures have been used successfully in nearly all of the training classes. The agencies of the Federal Government have been very active in manufacturing these visual aids, and they have been very generous in making these available to the training classes. There is no question as to the importance of these visual aids in any training program; however, some persons may be able to learn more readily if they handle and operate a teaching device than if they just see charts and pictures. No doubt many teaching devices which can be manipulated by the trainee have been constructed by the supervisors and instructors who have been responsible for the execution of the training programs.

One such device was used successfully in our training program for aircraft sheet-metal workers to help these workers in learning to read a micrometer. Nearly all sheet-metal workers have occasion to use and read the micrometer. It is not difficult for most persons to learn to measure with the micrometer, but for many of these people it takes a great deal of concentration and practice to learn to read the measurement that has been made. The use of charts and film slides did not produce the desired results in our classes, and this

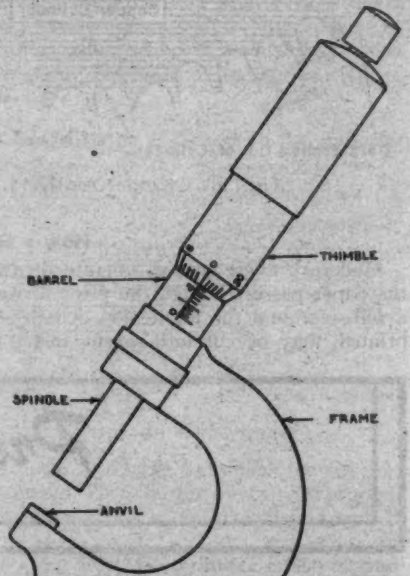

Fig. 1. Micrometer

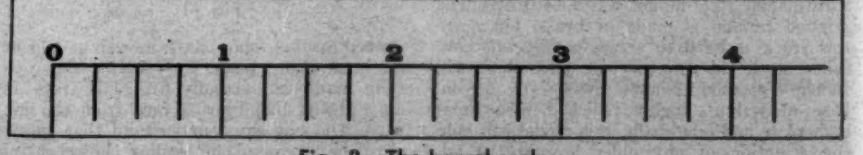

Fig. 2. The barrel scale

device was constructed in the belief that it would help the trainee to attain proficiency in reading the measurements he made. Because that belief was borne out in practice in our training classes, this description is offered in the hope that it may help other instructors with similar problems.

The materials of which this device is constructed are two used mailing tubes and some wide kraft gummed tape. The tubes should be at *least* 2 in. in diameter, and a larger tube is desirable. One of the tubes should fit inside the other rather snugly so that it will not move very readily. There should be enough friction between the tubes so that they will tend to remain in position until they are moved by the operator. See Figure 4.

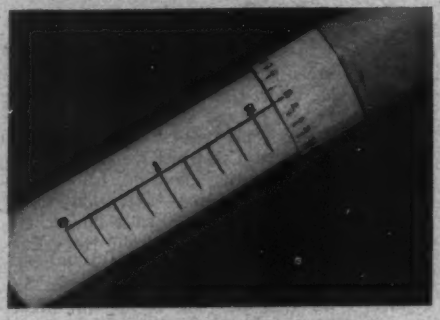

Fig. 4. The tubes assembled

These two tubes represent the barrel and the thimble of the micrometer. The following steps show how to mark the smaller tube so that it will represent the *barrel*. Make the marks and figures large enough and heavy enough that they may be read easily several feet from the operator.

1. Use a piece of kraft, gummed tape almost as long as the tube, and make a straight starting line from end to end.
2. Make the zero mark on the scale about an inch from the left end. See Figure 2.
3. Make the division marks a half-inch apart and about a half-inch long.
4. Make every *fourth* mark definitely *longer* than the other division marks.
5. Number these *longer* marks, 1, 2, 3, etc.
6. Paste this strip of marked kraft gummed tape lengthwise on the smaller tube so that the numbers read from left to right. The zero mark is near the left end. Care should be taken in making the scale and in pasting the tape on the tube so that it will not be torn or mutilated as the device is operated.

The larger tube should be marked around the end in the same way that the *thimble* of the micrometer is marked. The following steps show how this can be done.

1. Cut a piece of kraft, gummed tape that is *exactly* the length of the circumference of the larger tube.
2. Divide this tape into 25 equal divisions. See Figure 3.
3. Mark the left end starting point with zero.
4. Mark the fifth, tenth, fifteenth, and twentieth division points with *5*, *10*, *15*, and *20*, respectively, using *large* figures.
5. Label each of the other twenty division points with *smaller* figures *1*, *2*, *3*, *4*, *6*, *7*, *8*, etc., to *24*. The division marks should extend to the upper edge of the tape, and the figures should be placed in such a position that they can be read when the barrel and the thimble are in a horizontal position with the scale to the left.
6. Paste this tape around the end of the larger tube so that the tape will form a smooth edge for the thimble.

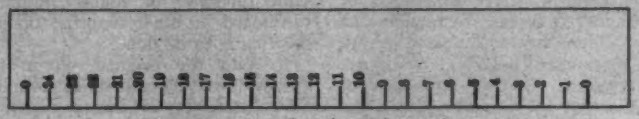

Fig. 3. The thimble scale

When the *barrel* tube is placed inside the *thimble* tube they can be manipulated so as to illustrate many micrometer settings, and these can be seen by a large group of students. If it is desired to teach the reading to four decimal places, the necessary scales can be added to the tubes, but these are not desirable for beginning students. The extra scales tend to confuse beginners, and it would be better to make a second training device for this advanced training.

In manipulating this device, be sure that the distance between the mark on the end of the barrel and the end of the thimble is synchronized with the reading on the thimble; i.e., when the thimble reading is *20*, the thimble should be advanced four fifths of a division past the mark on the barrel scale, and if the thimble reading is *12½*, the thimble should be halfway between two marks on the barrel scale. Because this device is used for class demonstration and for individual manipulation in the presence of the class, it is desirable for it to be made as large as can be easily handled. The illustrations will help to make the construction of the device a little easier.

A TURNED WOOD TRINKET BOX

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Since the project described in this article requires some gluing up, it will not be possible to complete it in one class period but the actual working time need be little more than an hour.

The materials required are a block of walnut or red gum 6 in. square and 1½ or 2 in. thick for the box, and a similar piece ¾ in. thick for the lid. A piece of waste wood should be used to receive the screws through the faceplate. Two 6-in. squares of heavy soft drawing paper are used to separate the layers of wood, as shown in Figure 1. Spread glue very thinly on the wood, lay the paper between, and clamp together for a few hours. The paper will hold the pieces of wood securely enough for turning but will split apart readily, when desired, if the glue is not applied to the paper itself.

Lay out a circle on either face of the glued-up block, saw out the round form on the band saw and fasten it to the faceplate with ¾-in. screws, centering it as accurately as possible. Attach to the lathe and adjust the tool rest to within about ¼ in. of the curved surface. Trim this smooth and true with the diamond-point tool, beginning at the flat surface and pressing toward the faceplate, removing such a small amount of wood at each revolution that a true circle will be insured. See Figure 2.

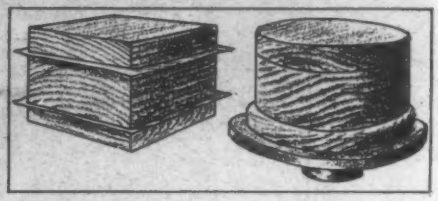

Fig. 1 Fig. 2

Several contours for the box and lid are suggested in Figures 3, 4, 5, 6, and 7, but all begin with a deep cut into the bottom of the lid ¼ in. wide and at least ½ in. deep, made with the parting tool, barely cutting the layer of paper from the top of the box. See Figure 3. Next, shape the top of the lid, then the sides of the box, using the diamond-point and the round-point tools. A flat steel scraper may be used to smooth the top surface of a lid such as shown in Figures 3 and 7. Sharp tools will save a great deal of sandpaper and steel wool in the final finishing.

Application of wax will be the quickest finish but a combination of linseed oil and

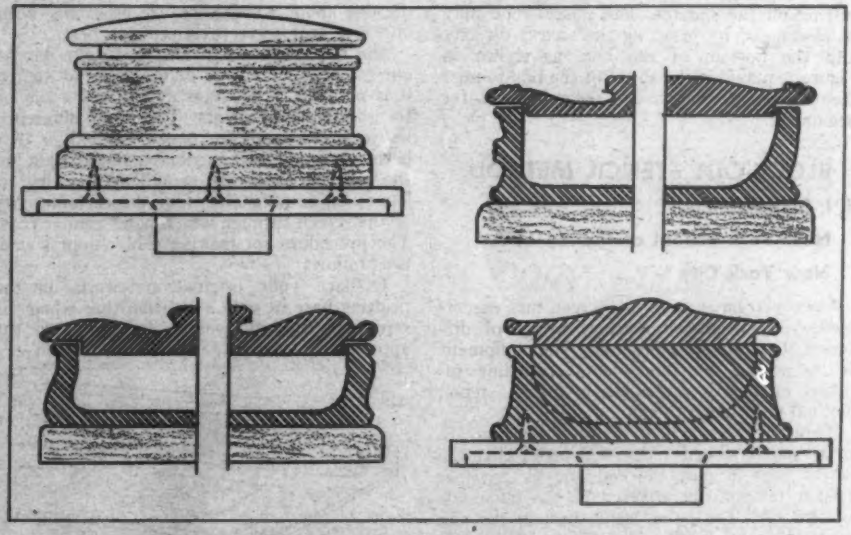

Fig. 3. Upper left. Fig. 4 and 5. Lower left
Fig. 6 and 7. Upper right. Fig. 8. Lower right

shellac is much better and almost as fast. Some workers prefer to mix the ingredients in advance; others apply them alternately or place the oil on the cloth first and then the shellac and apply them together. Some brush on a final coat of shellac and let it dry before proceeding, rubbing it down the next day.

When the finish is dry, separate the lid from the box with a wide chisel inserted at the paper line at the end grain. The split paper remaining on the box shows exactly where it is to be hollowed out to fit the lid. Mark this outline with the diamond-point tool before cutting away the paper.

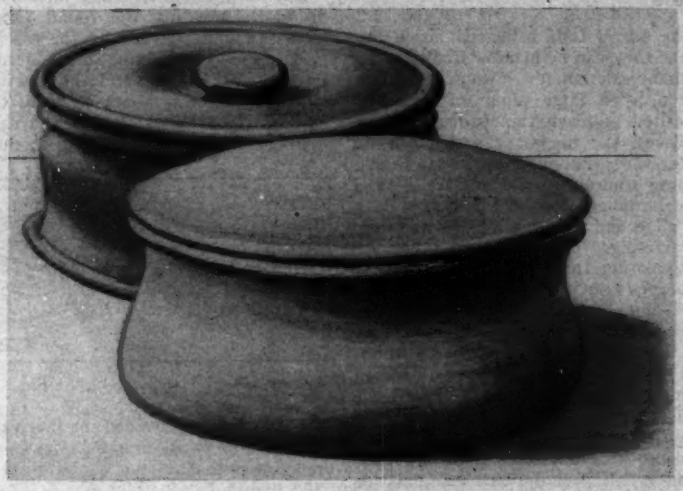

Fig. 9

The round-point tool will be used almost exclusively for shaping the inside. Leave the bottom at least ¼ in. thick, and the walls about 3/16 in., so that the lid will have a close fit. Sand and polish the inner surface.

Pry the box loose from the waste wood on the faceplate. Remove the paper from the bottom of the lid and the box by sponging with hot water, being careful not to spot the finish. The circle of waste wood left on the faceplate may be used repeatedly for other boxes.

For quantity production, time may be saved by gluing 6-in. strips of wood and paper together and clamping them before cutting off the squares. The waste wood may be eliminated by inserting the screws directly into the bottom of the box, as shown in Figure 8, planning the shape of the box to miss them. This method is not recommended for beginners.

BLOCK-OUT STENCIL METHOD

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New York School of Industrial Art

New York City

Once you have your silk screen unit assembled, you can use it with a variety of different stencil-making methods. The equipment is the same, the fundamental principle remains unaltered, regardless of which stencil method you choose to employ.

In a previous article we discussed how to make paper stencils. You will recall that the screen was in part blocked out by a paper frisket temporarily adhered to the underside of the silk. The paint went through the silk wherever the frisket was cut out, while wherever the paper was intact, it served as a substantial mask and barrier. As the method was described in that article it seemed very simple, almost as easy as cutting out paper dolls. It is by far the simplest of all five silk screen stencil-making methods. "Why then," you may ask, "bother with other ways of preparing stencils?

In the first place, a paper stencil is good only for a limited run. After an edition of three or four hundred copies are run off, the paper becomes laden with accumulated paint, and the mass becomes too heavy to support itself on the screen. Another limitation of paper stencils is that they do not permit the reproduction of thin lines, small lettering or other fine detail. The paper has a tendency to shift while the stencil is being cut, and if there are many isolated centers, they may move out of alignment during printing. After having built up the case of the paper stencil in the first article, and to all appearances shorn it of its glory in the present writing, we pause here to remind the reader that there are natural advantages and limitations to each type of stencil method, and it is the intention of the writer to present both sides of the case and leave final judgment up to those who will experiment with all the methods to find the one about which they are especially keen or which will serve their purpose best.

And now for a discussion of the glue block-out method. By means of this type of stencil it is possible to get finer detail, and a run of several thousand prints. The main difference between this and the paper method is that here we use a *fluid* medium painted right on the silk to form the stencil. When dry, it leaves an impregnable film on certain parts of the screen through which paint cannot pass. The procedure for making a block-out stencil is as follows:

1. Place your original art work on the printing base in such a position that when the screen is lowered over it, it will be in the approximate center.

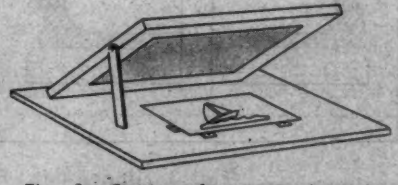

Fig. 1. Setting the original in the registry guides

2. When the correct position has been ascertained, fasten the usual three registry guides on the base, as shown in Figure 1.* Two of these guides go along the long lower edge of the original and the third flush against the lower left side. These guides can be of cardboard, celluloid, or any other substantial material, and they may be nailed down, rubber cemented, or stapled. They need be no bigger than an inch by a half inch and should be the same thickness or slightly thinner than the cardboard or other material upon which the printing is to be done.

3. With the original set in the registry guides, lower the silk screen over it and make an accurate key tracing in pencil or pen and ink of the outlines of the color areas of the original art work. See Figure 2. Because the silk is naturally transparent, it is possible to make this tracing without any difficulty.

Fig. 2. Tracing the drawing on the silk

4. The screen is now ready to be painted in with the glue filler. Use a good grade of glue such as LePage's, diluted with water to a convenient brushing consistency.

5. Using any brush to which you are accustomed for your routine painting, fill in the glue mixture all the areas that you want blocked out on the stencil. Leave untouched all areas through which you want the paint to penetrate. While brushing in the stencil, prop up the screen slightly, as shown in Figure 3, so that the silk is not in direct contact with the original. In fact, it is a good idea to remove the original from the base to avoid any possibility of the glue accidentally dripping down onto it.

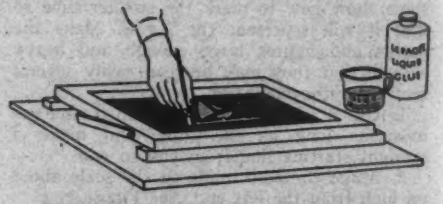

Fig. 3. Glue-painting around the design

6. Look over your work carefully. Be sure you have not left any "holidays" or "pinholes." You may touch up any such leaks, and you may even recoat some areas if you choose.

7. Allow time for the glue to set, or if you are in a hurry to see results, you may rush the matter along by artificial drying: turning on an electric fan, waving a card to create air current, or just opening a window wide will help some. On a dry day, it will take about an hour for the glue to dry. It will take a little longer on a humid day.

That is all there is to preparing a glue block-out stencil. Just as soon as it is dry, it is ready for paint and squeegee.

The print from a block-out stencil will not have the knife-cut sharpness evident in a stencil made with paper friskets. The lines will be softer and will show the mesh marks of the silk along the edges. With this type of stencil it is possible to print with all painting mediums except those of which water is a component part. In other words, you may print with oil colors, alcohol dyes, enamels, but not

*All illustrations used in this article are from *Silk-Screen Stenciling as a Fine Art* by J. I. Biegeleisen, published by McGraw-Hill Book Co.

with tempera colors. Should you for some reason like to use tempera colors with a block-out stencil, just substitute shellac or lacquer for the glue, and make a *shellac* block-out stencil or a *lacquer* block-out stencil. The procedure for tracing the drawing and painting in the stencil is the same.

The block-out stencil method has yet another advantage over the paper stencil. Whether it is made with glue, lacquer, or shellac, it may after it is used once, be put aside for a possible re-run at any future date. You have to be careful, of course, to wash all the paint out of the screen before storing it away.

Should you not desire to perpetuate the one design or should you need the screen for other designs, each block-out stencil can be dissolved with its corresponding solvent. A glue stencil can be washed off with warm water. A lacquer stencil can be dissolved with lacquer thinner, and a shellac stencil can be melted with alcohol. The easiest to remove is the glue; the most difficult is the shellac. Once the stencil fluid is dissolved, the screen is available for other projects.

Copyholder in use in school print shop

COPYHOLDER FOR THE SCHOOL PRINT SHOP

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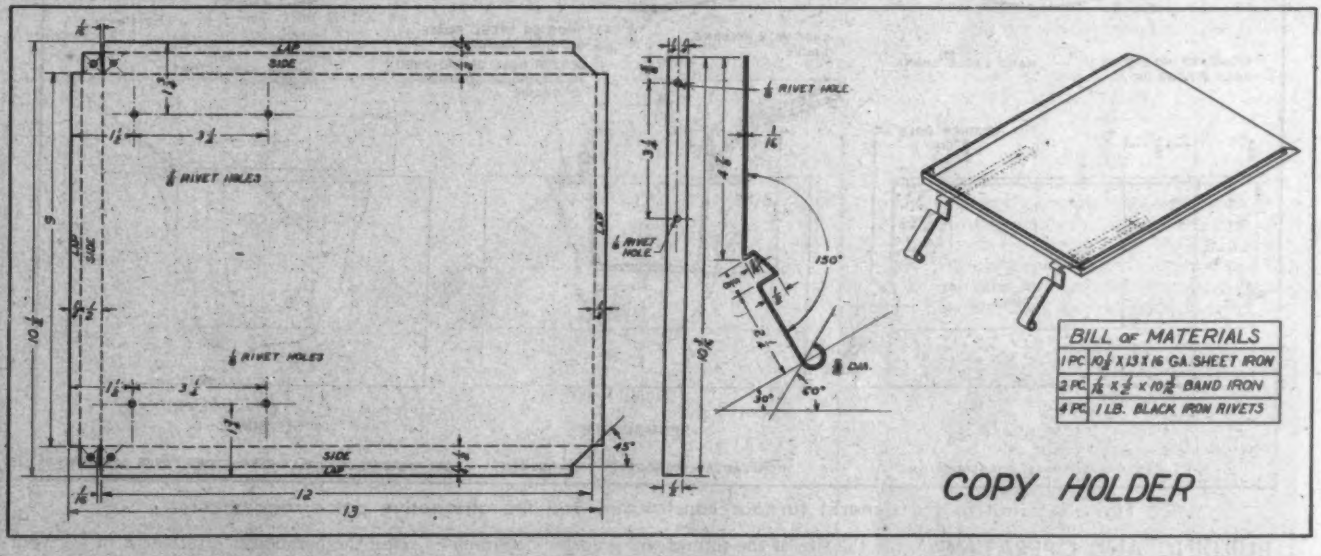
James Ford Rhodes High School

Cleveland, Ohio

Quite often the metal shop is confronted with a problem that involves original design to solve a problem for another department. In this case the print shop was in need of a copyholder that could be slipped over the edge of the work frame without using screws or marring the wood. These copyholders must also be removable for vacation storage.



Copyholder designed by Ernst Bereit

In the half-tone illustration are shown several copy holders mounted on the work frames. A piece of 16-gauge by 10½ by 13-in. sheet iron is used in the construction of these holders. The working drawing shows that the holders have three sides with a ¼-in. single hem on the top edges, and a ¼-in. single hem on the front edge.

Cut the stock square and to size. Lay out the bending lines and also the corner notches as shown. Bend the hems on the bar folder. The sides may be bent in the bar folder or in the brake. The corners are then riveted. The holes for the rivets may be hand punched or drilled. Use 1 lb. black iron rivets. Instead of riveting, the corners may be soldered, brazed, welded, or even spot welded, depending upon the facilities that are available.

The brackets are made of 1/16 by ½ by 10 3/16-in. band iron or they may be cut from 16-gauge sheet iron. Bend the brackets as shown and then lay out and drill the ⅛-in. holes for the rivets. Then the rivet holes should be transferred from the brackets to the tray. The tray and the brackets also might be spot welded together.

Remove all burrs and sharp edges; then enamel the trays to correspond with the color scheme used in the print shop.

ANIMAL GLUE NEWS NOTES

The following news notes have been furnished by the National Association of Glue Manufacturers, Inc., 55 West 42nd St., New York 18, N. Y.

● The glue and glycerine ink roller was invented in England in 1816. The first American printer to use the new roller was Daniel Fanshaw of New York City, printer for the American Tract and Bible Societies.

● Paper containers with a lining of plasticized glue have been used successfully to package motor oil.

● Animal glue is used in the lettering of tombstones. A thick layer of the glue is applied. Then the letters and the design are cut, through this covering, down to the stone. Then a sandblast is used for cutting them into the stone.

● Glue impregnated paper gaskets are used today on all jeep, tank, and airplane motors. This flexible, easily processed material is said to offer a tight seal, is easily removed, does not flux to metal, and is more vibration proof than regular gasket materials.

● Sandpaper is a comparatively recent product of civilization. The first abrasive in sheet form was shark skin originally used in the twelfth century. The Chinese, a hundred years later, attached powdered sea shells to parchment with natural gums to make a crude sandpaper. Later the Swiss used ground glass coated to a hide for wood finishing. Sand and glass were glued to paper on a commercial scale in England about 350 years ago, and in 1825 the first sandpaper factory was established in this country, making glass coated sandpaper. Abrasive grains used today are not sand but crystolan (silicon carbide), alundum (aluminum oxide), Garalum (aluminum oxide), and others. All of these synthetic abrasives are products of the electric furnace and in hardness approach that of the diamond. With garnet, flint, and emery carefully sorted for grain sizes, and firmly anchored to paper, cloth, and fiber backing with animal glue, they come to the market in the form of belts, disks, and special shapes.

blower, and auxiliary handling equipment, can be built for $29 to $43, the cost depending on whether an iron ladle or refractory crucible is used.

In addition to being inexpensive to build, the furnace has design features which permit considerable flexibility and ease in construction. It can be operated satisfactorily on low pressure gas lines, and is capable of handling up to 20 pounds of aluminum.

Furnace Design

Every attempt has been made to incorporate design features which will permit you to exercise your own ingenuity. The complete details of this furnace are illustrated in Figure 1, and the manner of construction is further clarified by the accompanying half tones.

The diameter and height of the firing chamber are determined by the maximum size of the crucible which you select. If the furnace is to be equipped for operation with both the refractory crucible and iron ladle, temperatures during prolonged operation of the furnace.

In the design illustrated at the left hand in Figure 1, the height of the firing chamber is identical with the height of the brick. With the diameter of furnace shell indicated the arrangement will accommodate refractory crucibles holding up to 14 pounds of aluminum.

Special attention should be given to the tangential entrance of the burner hole. In its construction it is essential that the flame sweep uniformly around the periphery of the pot rather than impinge against it. This will insure a more uniform heating throughout the firing chamber, and prevent the localized abrasion of the pot by the stream of hot gases.

The basic furnace construction is readily adaptable to either of the crucible arrangements shown in Figure 1. There are several factors to consider in choosing which melting pot to use. The iron ladle-iron cover arrangement is cheaper to make and permits the melting of more metal. This setup is also safer be-

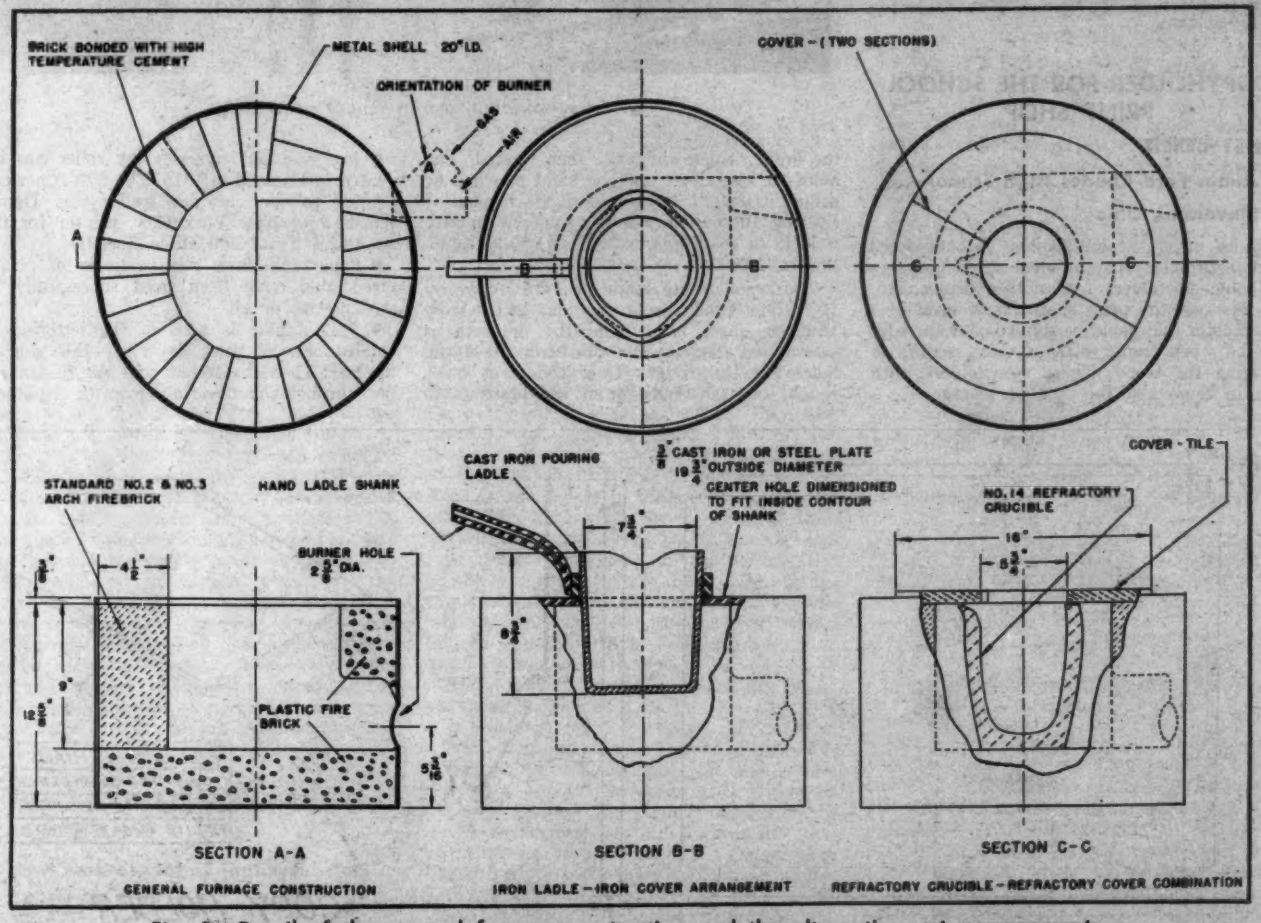


Fig. 1. Detail of the general furnace construction and the alternative pot arrangements

BUILDING AND OPERATING A SMALL ALUMINUM MELTING FURNACE

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Pittsburgh, Pa.

Your high school or vocational school metal shop can now build a small gas-fired aluminum melting furnace at a cost which is well within the most limited budget. The entire unit, including the furnace, burner,

the size of the former will probably determine the dimensions of the firing chamber. In either case, however, the inside diameter of the chamber should be 3 or 4 in. larger than the outside diameter of the pot. The size of the firing chamber together with the depth of the brick will impose a limitation on the minimum diameter of the furnace shell. Within reason there is, of course, no limitation on the maximum diameter of furnace shell, for the construction can still be accomplished (without effecting any increase in the size of the firing chamber) by placing a layer of either plastic firebrick or insulating material between the hearth brick and the metal retaining wall. The latter material will result in lower metal shell

cause the permanent attachment of the pouring shank to the ladle enables the operator to maintain a more respectable distance from the molten metal, and because there is less danger of accidental pot breakage. On the other hand, the sizes and shapes of iron ladles are not standardized, and it may be difficult to find a suitable pot. In addition, the shank band will probably have to be forged in order to fit the contour of the ladle. More work will also be required to cut the steel plate so that it will fit both the contour of the ladle and the inside circular contour of the metal shell. Furthermore, the melting and heating times are considerably longer, and the melting efficiency therefore lower in the iron ladle

than when a refractory crucible is used. Greater melting efficiency could undoubtedly be obtained if a deeper iron ladle were employed or if the band on the pouring shank were adjusted to allow the ladle to settle lower in the furnace. Actual operation performance data for these alternative melting pot arrangements are given in Table 2.

The principle advantages of the refractory crucible refractory cover combination are its ease of assembly and high melting efficiency. Refractory crucibles can be obtained in standard sizes and pouring shanks may be purchased to fit the particular size of crucible selected. Except for the sawing of the refactory cover, the various components may be used as purchased. With reasonable care the operating life of both the iron and refractory crucibles should be about the same.

The burner, like the furnace, was designed to make use of inexpensive and readily available parts. Details of the burner unit are illustrated in Figure 2. A standard 1½-in. Y pipe fitting forms the basic part of the assembly with the air and gas supplied through appropriate nipples and hoses. The air stream passes directly through the Y while the gas enters from the side. The ⅜-in. nipple extending into the Y through the bushing in the gas line is placed so that the gas is expelled near the center of the air stream. This arrangement will provide the best conditions for combustion.

If compressed air is not available, some sort of portable blower, such as that which might be obtained from an old vacuum cleaner, will be required. The manner of coupling the air hose to the blower will depend upon the type of extension that is on the particular blower unit. A valve mechanism of some kind must be provided in the air lines; we varied the air flow by placing a cardboard throttle over the air intake on the blower. In addition, the gas line must be equipped with a device for adjusting the rate of delivery; a simple globe valve will work satisfactorily. If it is not convenient to pipe the gas directly to the furnace location, a ½- or ¾-in. hose will provide a suitable interconnection. If a hose connection is employed, a second valve should be connected on the line end. Some variation in the size of nipples recommended in Figure 2 can be tolerated without seriously affecting the operation of the burner. If the burner unit is operated from low pressure (4–6-oz.) gas lines, the air supply may have to be partially closed because the blower will probably introduce an excess of air, even with the gas line wide open.

Fig. 3. A view into the firing chamber showing the tangential entrance of the burner hole

Furnace Construction

The first step in the construction of the furnace is the preparation of the furnace shell. Although almost any cylindrical metallic container is satisfactory, shells of thin gauge material should be avoided since some rigidity is needed to prevent distortion when the bricks are fitted in place. The burner hole should be sufficiently large to receive the flanged head of the burner. With a standard 1½-in. Y fitting, the 2⅝-in. hole indicated in Figure 1 will be satisfactory.

If possible, the shell should be placed in its final position before proceeding with the brickwork, inasmuch as the completed furnace will be heavy. A layer of firebrick or some other refractory or insulating material will make a satisfactory base, although a combination of the latter and a heavy metal plate will probably provide a neater and more serviceable arrangement.

Plastic firebrick is generally supplied in large rectangular blocks ready to use. The blocks should be broken up into small chunks and tamped into the bottom of the furnace shell. The amount of plastic material to add may be gauged by placing, at intervals during the ramming, one of the firebricks into place and then noting the position of the top of the brick with respect to the lip of the furnace shell. If the iron ladle arrangement is to be used, the shell should extend about ⅜ in. above the firebrick in order to accommodate the heavy circular iron or steel plate. The ramming should be done in a manner that will result in a uniformly flat surface upon which the firebrick may rest.

Arch-type firebricks are required to form the sides of the firing chamber. These bricks are supplied in standard sizes, each of which is of a suitable wedge shape to *turn* a circle of a definite diameter. Since the size of an available furnace shell will seldom be the same as the circle diameter provided by any of the standard sizes of arch brick, it is usually necessary to use arch bricks of two different sizes. For shell diameters ranging from 15 to 30 in., a combination of Numbers 2 and 3 arch firebrick will be required; the number of each size was determined from the following formulas:

$$B = 2.51R'$$

$$X = \frac{6.28R - B}{0.75}$$

$$Y = B - X$$

R = inside radius of circle in inches
R′ = R + 4.5 outside radius of circle
B = Total number of bricks required to turn the circle
X = Number of larger pieces required
Y = Number of smaller pieces required

If insulation is to be provided between the

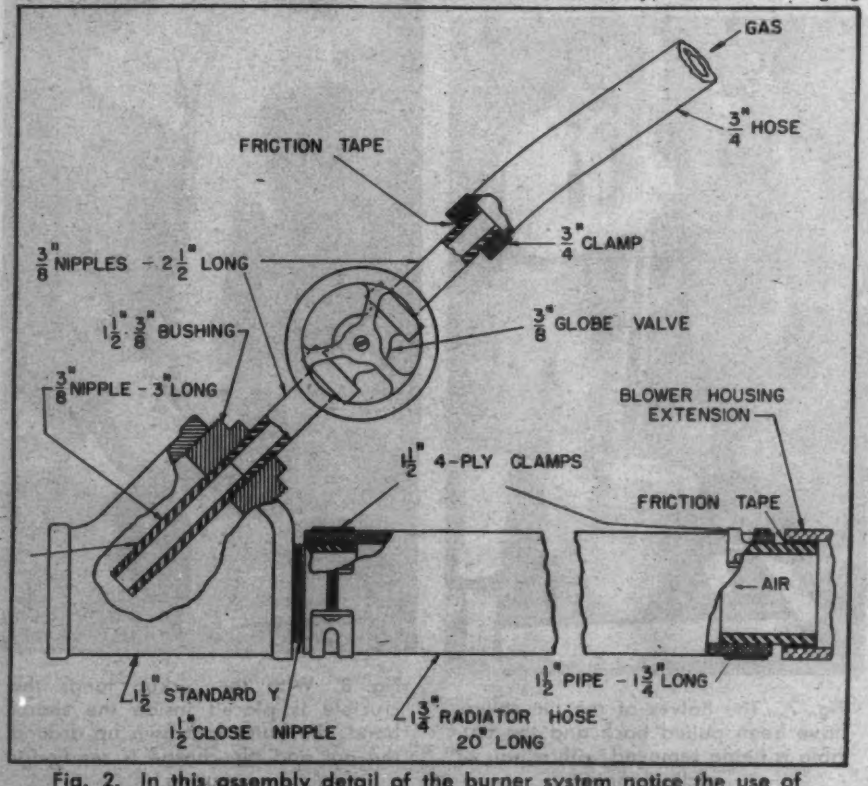

Fig. 2. In this assembly detail of the burner system notice the use of inexpensive and readily available components

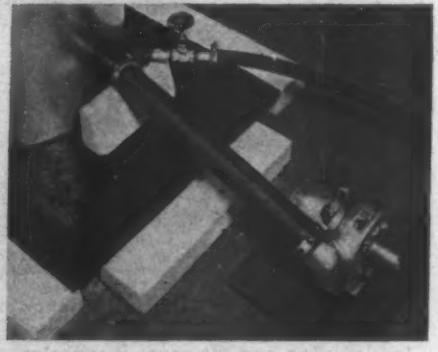

Fig. 4. In this close-up of the burner and its auxiliary components notice the extension of the burner lip into the furnace and the simple method of providing support

Fig. 5. An over-all view of the furnace equipped for operation with an iron ladle and a heavy iron supporting cover. The escape of the combustion products is effected by leakage around the melting pot and under the cover

shell and the brick, the desired diameter of the firing chamber (the inside diameter of the brick circle) should be used to determine the number of each size of brick needed. The same formulas can be used to make this calculation.

In order that you may get a much better idea of how to alternate the two sizes of brick and how to allow for the construction around the burner hole, it is wise to fit the bricks loosely around the complete circle before applying the mortar. An even circle can be obtained by alternating the bricks of one size with those of the other. There are undoubtedly other methods of arranging the bricks adjacent to the burner hole, but the construction illustrated in the top furnace view of Figure 2 has been found to be satisfactory. If this plan of bricking is followed, the cementing should be started with the inverted brick shown just below the burner hole (Fig. 1) and continued around the circle in a clockwise direction. It is preferable to mix the high temperature mortar very thin so that it may be applied by dipping the face of the brick into the surface of the mortar. A thin coating of cement is sufficient and none is required on the bottom of the bricks.

A closer inspection of Figure 1 will reveal that the space which is adjacent to the burner hole has been rammed with plastic firebrick. This ramming should preferably be done before the mortar has set between the bricks.

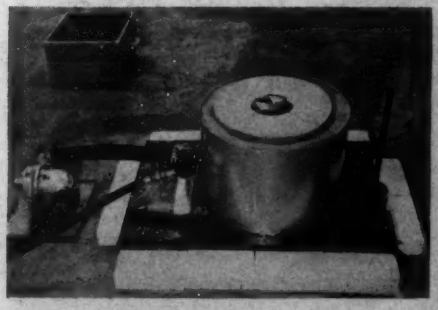

Fig. 6. From a melting efficiency standpoint the combination of refractory crucible and tile cover is superior to the iron pot arrangement of Fig. 5. A skimming tool projects from the receptacle in the right foreground

Prior to the ramming, a block of wood, or some other obstruction, should be placed in the burner channel so that its subsequent removal will provide a passage for the flame. When all the bricking has been completed excess mortar may be removed from the exposed brick faces with a damp cloth or brush. The mortar should be allowed to dry for about 24 hours before any flame is introduced into the firing chamber. A very low flame should be used at first, with the heat being gradually increased until the plastic firebrick has dried and permanently set.

The iron ladle and iron cover arrangement requires the fitting of the shank band to the pot and the cutting of the metal plate. If the school shop does not have a forge or cutting torch, this portion of the work can be completed in an outside jobbing shop. The shank should be fitted to allow the ladle to extend as low as possible into the firing chamber; the cover plate should be cut so that it fits snugly into the recessed area provided by the 3/8-in. projection of the furnace shell above the firebrick.

The cutting of the tile cover is the only construction item encountered in the furnace setup which utilizes the refractory crucible. The diameter of the center hole should be about the same size as the inside diameter of the melting crucible. This hole is provided principally to make room for the butt ends of the charge, but is also useful as an escape rope for the products of combustion. The tile cover is split to facilitate the entry and removal of the crucible, as shown in Figure 7. There is some tendency for the tile cover to crack under heat, but this may be relieved either by cutting the cover along more than the one diameter indicated in Figure 7, or by using a thicker tile.

In construction of the burner system, trial-and-error procedure will probably be required to effect the extension of the 3/8-inch nipple into the center of the air stream. The precaution should be taken to insure tight joints in all of the interconnections. A suitable base, such as that illustrated in Figure 4, should be provided for the blower unit.

The application of one or two coats of heat-resisting aluminum paint to the outside of the furnace shell will give the entire unit a neat and professional appearance. The painting of the burner and other pieces of the auxiliary equipment is left to your discretion. Paint will not, of course, adhere permanently to surfaces exposed to red or near red heat.

Little difficulty should be encountered in finding the various parts for the furnace. The more specialized equipment may, of course, be purchased through foundry supply firms. Miscellaneous items will be found in plumbing shops, hardware stores, and rubber supply houses. All the refractory materials can probably be obtained from a dealer who handles firebrick.

Operation of the Furnace

Prior to the actual firing, care should be exercised to see that the lip of the burner is suitably inserted in the burner hole, that the burner system is properly supported and that it is suitably directed to provide the tangential swirling of the flame around the melting pot. The details of these arrangements are illustrated in Figure 4. If the iron-ladle iron-cover combination is used, it will be necessary to remove the ladle before lighting the furnace; with the refractory crucible arrangement, however, the lighting may be accomplished with the crucible and charge in place.

Upon completion of these preliminaries, and with the gas and air valves completely closed, a lighted newspaper is dropped into the firing chamber. Then the gas is turned on and after ignition has taken place the air valve is slowly opened. The amount of air should be gradually increased until an intense, blue, roaring flame is produced, but it should not be increased to a point where the flame starts to sputter. The delivery of too much air will blow out the flame. If this should happen, the

Fig. 7. The halves of the tile covers have been pulled back and the crucible is being removed with a pair of pickup tongs

Fig. 8. With the pickup tongs the crucible is placed inside the shank band, the latter is drawn up around the pot and the charge is ready for pouring

gas and air should be turned off — in that order — and the entire lighting procedure undertaken a second time. As the furnace warms up, much more air can be supplied to the burner before sputtering will occur. If the maximum flame temperature is desired, it is essential to retain the highest rate of air delivery.

While the refractory crucible needs no preparation prior to charging, the high solubility of iron in molten aluminum requires that some means of separating the two metals be provided. Coating iron pots with calcium carbonate have been found satisfactory in effecting this separation. A mixture of 7 pounds of this material for each gallon of water will give a suitable consistency for brushing. The usual practice is to heat the iron pot to a temperature slightly higher than the boiling point of water and then brush with the calcium carbonate suspension until a film of moderate thickness has been attained. A newly coated pot should be thoroughly preheated to insure the removal of all moisture before the metal is introduced. Cleanliness is also essential, regardless of the type of pot being used. Dirt or loose scale should always be removed before charging a new batch of metal.

With the iron-ladle iron-cover setup, the pouring of the charge is accomplished by grasping the shank handle and carrying the metal to the mold. With the refractory crucible setup, however, pickup tongs must be used to remove the crucible from the firing chamber before the shank can be secured and the pouring operation completed. The lifting of the crucible from the firing chamber is illustrated in Figure 7, and pouring from the refractory crucible is shown in Figure 8.

Safety Precautions

The use of proper clothing and protective equipment is the first prerequisite of safety in the foundry. Ample eye protection is needed to work near molten aluminum. Goggles may be sufficient, but the full face mask illustrated in Figures 7 and 8 will give additional protection to the face and throat. When metal is being poured, suitable asbestos leg protectors and heavy asbestos gloves are also needed. In addition, when the iron pot is being used, a thick asbestos pad should supplement the gloves while grasping the shank handle. As a final safety warning, do not forget that any receptacle which is either to be dipped into molten aluminum or to receive molten aluminum should be thoroughly dried. Splattering of explosive violence is almost certain to occur when molten metal contacts moisture.

TABLE 2. Performance Data

	Iron ladle arrangement	*Refractory crucible setup*
Time to complete melting — min.	40	24
Time for metal to reach 1400° F. — min. (time from start of run)	54	34
Gas consumption on heating to 1400° F. — cubic feet (measured from start of run)	145	91
Approximate efficiency	3.5%	6.0%

The test was conducted under the following conditions: (1) Each run started with cold metal and cold pot. (2) Weight of metal charge was 10 pounds. (3) Gas delivered at a pressure of 4.1 ounces per square inch. (4) A constant gas delivery of 2.68 cubic feet per minute was maintained. The furnace efficiencies were determined by dividing the theoretical value of the heat required to melt the charge by the total heat units actually supplied to effect the melting.

TABLE 1. Cost Schedule

Component part groups	*Part*	*Number or amount required*	*Cost of items listed in previous column*	*Total costs*
General furnace construction	Plastic firebrick	100 lb.	$ 3.75	
	No. 2 & No. 3 arch firebrick	20 (total)	2.00	
		15 lb.	1.50	
	High temperature cement	1 pint	.70	
	Aluminum heat resisting paint			$ 7.95
Burner system	1½" Standard Y	1	.85	
	1½" to ⅜" bushing	1	.09	
	⅜" nipple — 3" long	1	.07	
	⅜" nipples — 2½" long	2	.14	
	⅜" globe valve	1	.97	
	¾" hose	10 ft.	2.40	
	¼" 4-ply clamps	2	.10	
	1½" close nipple	1	.15	
	1¾" radiator hose	2 ft.	.64	
	1½" pipe — 1¾" long	1	.15	
	1½" 4-ply clamps	2	.34	
	Vacuum cleaner blower	1	6.00	
				11.90
Iron ladle arrangement	Cast iron ladle — 20-lb. capacity	1	1.98	
	Pouring shank	1	2.65[1]	
	Iron cover — ⅜" thick	1	4.25[2]	
				8.88
Refractory crucible arrangement	No. 14 Refractory crucible	1	2.60	
	Tile cover — 1" thick	1	1.05	
	Pickup tongs	1	15.13[3]	
	Pouring shank	1	4.13	
				22.91
Total furnace cost with iron cover arrangement				28.73
Total furnace cost with refractory crucible method				42.76

[1]Includes 40 cents blacksmith charge for fitting shank band to pot.
[2]Includes $1.25 labor charge for cutting and trimming of plate.
[3]While the use of the pickup tongs is recommended, a pair of small straight lip tongs will be found suitable for removing the crucible from the furnace. The cost of the straight lip tongs is $1.50.

VISUAL AIDS FOR THE SCHOOL MACHINE SHOP

LEONARD KROLL
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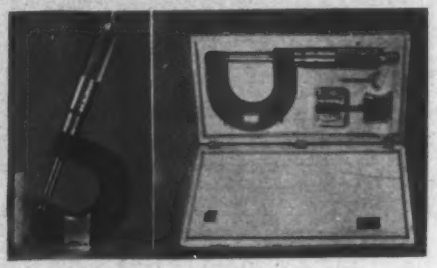
Anyone even remotely connected with education has been impressed with the use of visual aids and their great effectiveness in shop subjects. The war has accelerated developments in this field through the war industries training programs, in-plant training, and the armed forces training courses.

Most shop instructors follow a course of study set up by themselves or their department. However, there are usually a few above average students in each class who can be given special assignments without interfering with their progress in the regular class routine. The visual aids to be described have been made by these students with special instruction and some after hours' design work.



The demonstration micrometer and its carrying case

The micrometer design was based on standard construction with a scale of 4:1. To reduce its weight, the spindle was made hollow, and the frame consisted of welded sheet steel. Aluminum would be the ideal material if available. The accuracy of the model is well within .001 in. and the ratchet is authentic. In using the model to explain its construction and also to explain the method of reading, it was found tiring on the arms to hold it for even a few minutes. A simple notched sliding clamp applied under the center of gravity supports the micrometer very well and eliminates the necessity of holding. The wooden carrying case, made by the woodworking shop, makes it convenient for storage and to carry it from room to room.

Turrets for the lathe

The two turrets illustrated were also made in the school shop for the purpose of showing the students the general principles of setup and operation of the turret lathe when only an engine lathe is available. They are also useful in turning out small quantity lots whenever the occasion arises. The two knobs on the compound rest turret and the knob on the tailstock turret were made of different types and colors of plastics to illustrate a practical application of this material to actual use.

These models are not only very helpful in the teaching of the machine-shop work but they arouse great interest and admiration and act as a valuable motivating force.

PRACTICAL WOODWORK "SEESAW" TEST

ISADORE M. FENN

Chicago Vocational School
Chicago, Ill.

Instructors who are on the alert for projects which truly challenge the individual, allow for individual differences, test the individual's mechanical aptitude, and at the same time hold his interest, will welcome the project described herewith. It requires very little motivation and can be introduced near the end of the semester as a two- or three-day practical test project.

Before the actual beginning of the test the instructor should issue blueprints and directions or steps in construction. The instructor should also provide a discussion period for questions and explanation. The test should not begin until all the students have obtained the necessary material and checked and sharpened their tools.

Steps in Construction:

1. True up piece D and glue piece I on D in proper position.
2. True up to size 2 E's and 2 F's and shape.
3. Make layout for middle-lap joint and cut to fit.
4. Bore holes for dowels in E's and F's.
5. Cut the proper size G dowels.
6. After glue has dried, shape I on D according to the drawing.
7. Bore holes for dowel pegs A, B, C, in D.
8. Cut proper size dowel pegs — broom sticks will do.
9. Sandpaper all parts.
10. Glue the joints and assemble E's and F's with G dowels and glue.
11. Paint or mark the designated colors on the dowel pegs.
12. Wax pivot H dowel to help parts D and I balance easily.
13. Assemble and glue ends of pivot H dowel into the F's.
14. Completed seesaw may be finished with stain, shellac, lacquer, or color combination.

Items, such as follow, should be taken into consideration by the instructor when in the process of grading this test project:

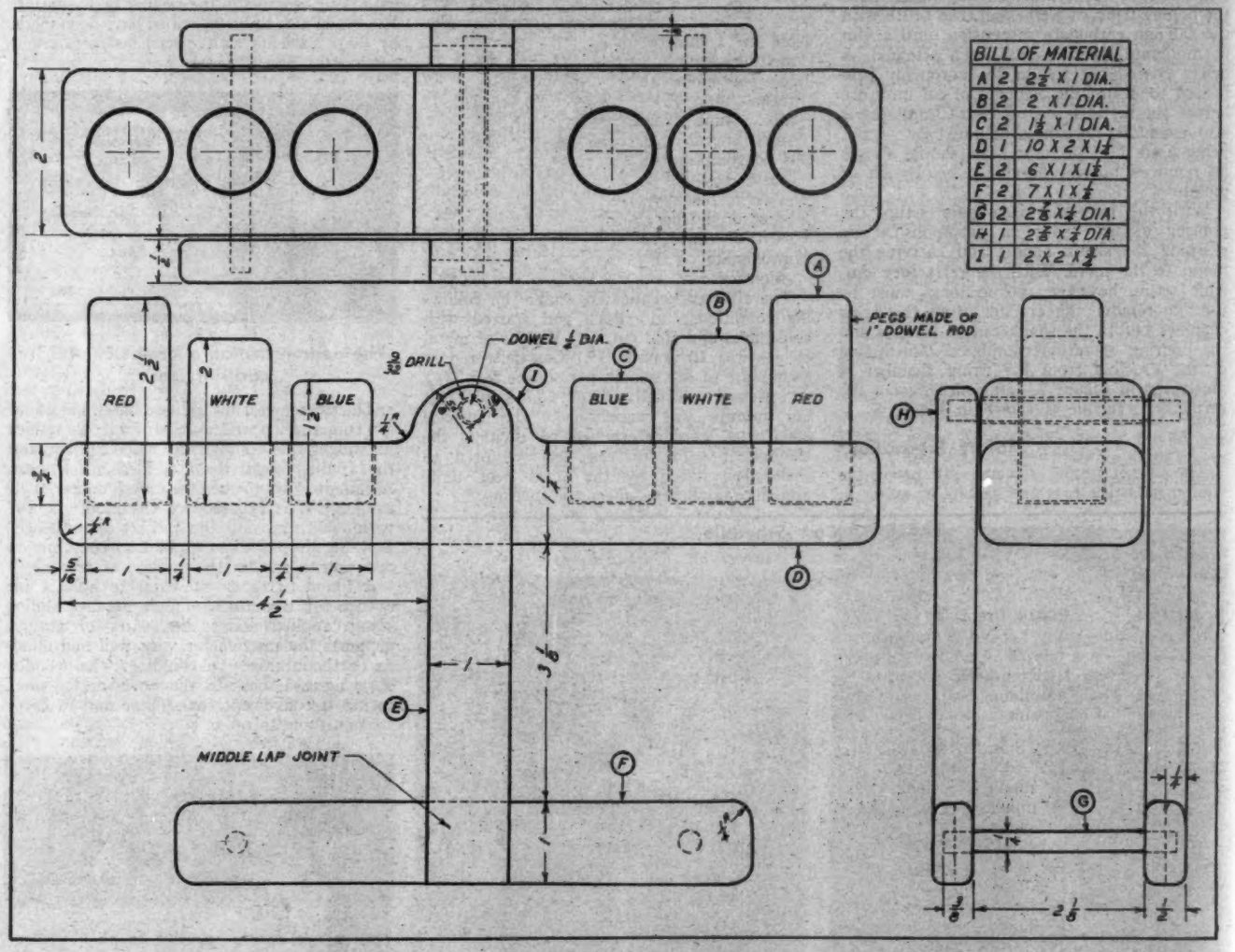
1. Total time spent in construction.
2. Comparison of parts to dimensions on the drawing — length, width, thickness, and trueness.
3. Degree of accuracy of assembled project.
4. Degree of balance — how close to a 90° angle with the upright of base.
5. The finish on the project.

Experiences:

Discussion, blueprint reading, obtaining required material, sharpening tools, squaring, planing, gluing, layout, measuring, knifing, chiseling, joinery, sawing, gouging, boring, sanding, assembling, finishing, and judging.

An exhibition in the shop of the finished seesaws and enlistment of all the students for grading the projects will focus attention on the different degrees of workmanship, and help develop in each student a fine sense of judgment of craftsmanship.

Practical checkups of this nature are necessary in the shop to prove to the student, as well as to the instructor, that a particular student has acquired or lacks that certain degree of technical skill.


BILL OF MATERIAL
A 2 2½ X 1 DIA.
B 2 2 X 1 DIA.
C 2 1½ X 1 DIA.
D 1 10 X 2 X 1½
E 2 6 X 1 X 1½
F 2 7 X 1 X ¾
G 2 2⅝ X ¼ DIA.
H 1 2⅝ X ¼ DIA.
I 1 2 X 2 X ¾
PEGS MADE OF 1" DOWEL ROD
DOWEL ¼ DIA.
DRILL
RED
WHITE
BLUE
BLUE
WHITE
RED
MIDDLE LAP JOINT

Seesaw Test

A QUAINT GLASS SHELF

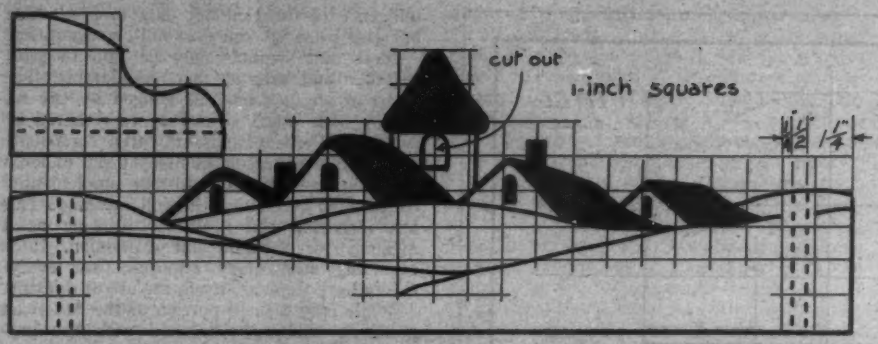
HAZEL F. SHOWALTER

Davenport, Neb.

This glass shelf with wood back and ends is intended for use in kitchen or bathroom. Its advantage lies in the fact that the glass shelf will not be spotted by moisture and can be readily wiped clean.

Material:

1 pc. ½ by 8 by 24-in. soft pine for back
2 pcs. ½ by 4 by 8-in. soft pine for brackets
1 pc. 5½ by 21-in. plate glass with rounded edges, for shelf



Details and finished glass shelf

Enlarge the patterns for the ornamental back and the brackets with inch squares. Cut the 2 mortises in the back the exact width of the wood and cut the mortise on the inner side of each bracket to fit the glass shelf. Glue the brackets in the mortises of the back but lay the glass shelf aside until the wooden parts are enameled.

Apply 2 coats of white enamel to the back and the brackets.

Transfer the design to the enameled wood with carbon paper.

Enamel the buildings pale tan with bright red roofs, chimneys, and windows. Make the lines that mark out the snow-covered hills with pale greenish blue. Add white to lengthen a color. Other schemes are possible. The roofs and windows might be blue with the other colors unchanged, or the buildings might be yellow with brown roofs.

A HANDY PROJECTION BOX

JOHN W. DEAN

Arlington Heights, Ill.

We have often seen the glass box illustrated in mechanical drawing textbooks, and a few of us have tried to make one, only to have the adhesive tape gradually slip and allow the pieces to fall apart.

The box shown in Figure 1 is made of heavy celluloid joined by strips of transparent cellulose tape. Such celluloid may be obtained from dealers in stationery or drafting supplies in sheets. Purchase a piece 6 by 20 in., and have it cut accurately into two rectangles 6 by 7 in., and one square 6 by 6 in. Use the square for the *side* or end view, and the others for the *top* and *front*. Keep the celluloid as clean as possible, as ink will not adhere to the oily spots left by finger prints.

Cut off a piece of tape a little over 7 in. long and lay it (sticky side up) on a flat surface. If it tends to curl, secure the ends with short bits of tape. Lay the long edge of one rectangle a little less than halfway over the tape and press it down; then the other rectangle on the other side of the tape leaving about 1/16 in. space between. Clip off the ends of the tape, turn it over, and add another strip on the opposite side of the joint. Clip the ends of the tape about ⅛ in. long, and turn them back over the ends of the first. Repeat the foregoing along a 6-in. edge of the rectangle and one side of the square.

The base should be of well-seasoned wood ¾ in. thick and at least 7 by 8 in. Cut two grooves with a thin circular saw ⅛ in. deep and ½ in. from one end and one side to hold the celluloid in place. At the corner opposite the intersection of the saw kerfs a hole is to be drilled to receive a 6-in. piece of wire or slender dowel as a support for the back corner of the box. Small holes are punched in the celluloid so it may be thumb-tacked to the bulletin board repeatedly.

The model shown in Figure 1 is made of cardboard as shown in Figure 2, folded along the marked edges, and held together with bits of tape. Each surface is plainly labeled and may be painted a different color, in order to identify it at a distance. It is suggested that the three views most commonly used be painted with the primary colors (red, yellow, and blue) and the others left uncolored, or painted with the secondary colors, if your textbook makes any use of the bottom, back, or left views.

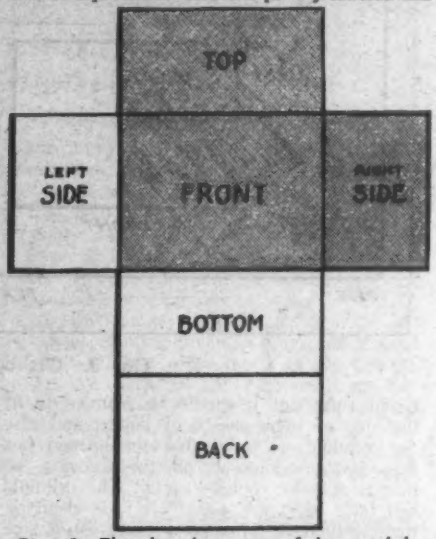


Fig. 2. The development of the model

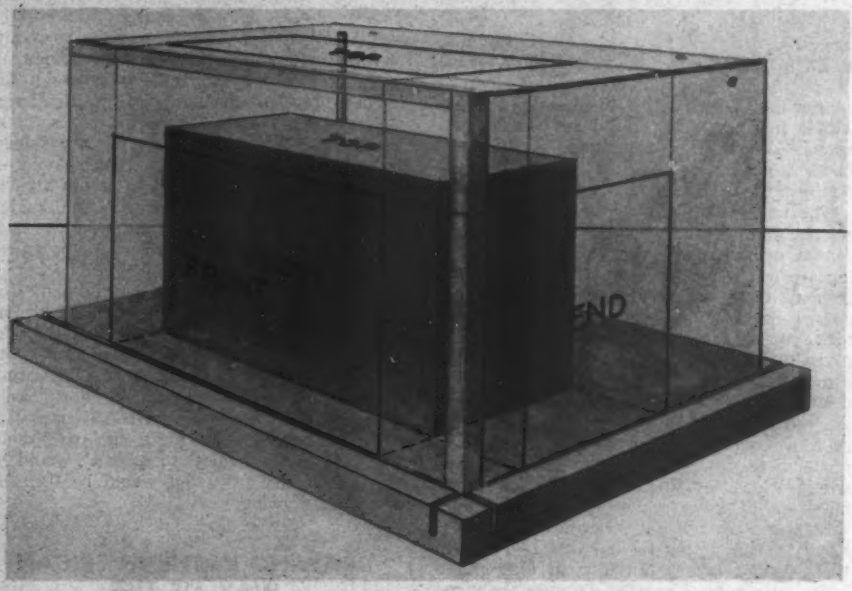


Fig. 1. The celluloid projection box

Figure 3 shows a sample drawing of the same model. Of course, you may use a dif-

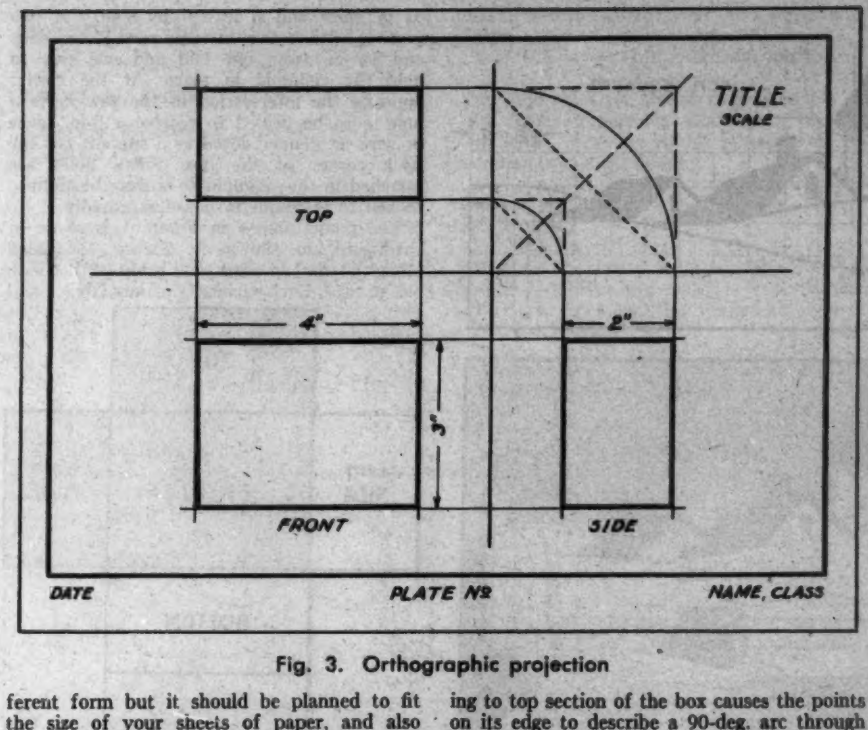


Fig. 3. Orthographic projection

ferent form but it should be planned to fit the size of your sheets of paper, and also the celluloid, in order that the opened box may be superimposed on the drawing, so that it may be copied exactly. The celluloid will take India ink readily if it is clean. If the celluloid is soiled or greasy, it may be washed with warm water to which a little vinegar has been added. A drawing pen will probably scratch the celluloid but a small speedball pen will make a clear heavy line which may be washed off if necessary. Mark the views on the celluloid just the same as on the model. Projection lines may be made with a fine pen or with red ink. The model may be supported on four brads if desired to raise it above the base, but it is well to establish the idea of a "base line."

The purpose of this device is to show the relationship of the views so clearly that it cannot be missed. So many classes in drafting are conducted merely for the purpose of teaching boys and girls to *read* drawings, and consist chiefly of copying complete drawings, often quite complicated, or by completing partially made drawings. Too often they neglect the basic principle of orthographic drawing (projecting at right angles) to such an extent that many who have completed such a course could not draw the simple model here shown unless the instructor gave specifications for the layout. No doubt, the majority of boys grow up with a general knowledge of reading drawings, but it is keenly disappointing to find that so many of them cannot express an original idea graphically, in a correct manner, because the views are not correctly placed or connected or proportioned, as no use has been made of projection lines to save repeated measurements and to prevent errors.

A trained draftsman may erase the pencil lines used to separate the views, or he may be able to eliminate their use entirely, but it is advisable for beginners to leave them on their finished work in order that the reason for the "quarter circle" projection across the upper right corner may be understood. Lifting to top section of the box causes the points on its edge to describe a 90-deg. arc through the air and its center *must* be the intersection of the three planes. Then, it may be easily demonstrated that the *dotted* lines, drawn with the 45-deg. triangle, will give the same results (though with increased possibility of error) and may be used when no compass is available. The third method, represented by the *broken* lines, is simpler and more accurate. Also, the 45-deg. line may be drawn by measurement, as the diagonal of a square, if neither compass nor triangle is at hand. An excellent test problem is that of making a usable drawing of a simple project without instruments. A strip of paper may be folded to form a straight edge; a piece having a straight edge may be folded to obtain a right angle; a folded square gives a 45-deg. angle; a thin strip of paper, a pin, and a pencil make it possible to draw true circles. All measurements should be estimated.

Additional celluloid boxes may be made for solid wood models until the relationship of all views is clear to the class. It should be understood that the view is chosen for the *front* which fits best into the drawing rather than the one which would be most easily seen in the finished project when constructed. An example is a cleat for a cupboard shelf. The front, as seen in the cupboard, would be the *end* of the cleat, but would be the *side view* in a drawing.

DRAWING IN THE AMERICAN WAY OF LIFE

DANIEL GREEN

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Menomonie, Wis.

The continued growth of the *American Way of Life* has brought each of us into closer and closer contact with the products of technology. The increase in the complexity of the mechanisms which are also of daily use by the American public has required the dissemination of new knowledge, the overcoming of old prejudices, the perfecting of new techniques and new processes, and invited participation in new modes of life, all of which called for a reservoir of human intelligence to function not only in production but also in social and economic consumption.

Ideas and symbols may be said to grow together and are, in fact, inseparable. The grasp of an idea may be gauged by the accuracy with which it may be represented by symbols. Word symbols are often inadequate for the full expression of many types of ideas and relations and often must be supplemented by drawing to convey the full meaning. This has increased the need for drawing as a medium for thought and expression. It is becoming increasingly important for everyone to have some ability in the use of drawing.

While only a small portion of the American public is directly concerned with the production of goods, a much larger part is involved in the handling, use and care of the finished product. We must learn how to operate and how to take care of the things which we use daily, and drawing will help us do this. Drawings may be used to tell about these products, and to show how to assemble, install, operate and service such things as automobiles, washing machines, oil burners, milking machines and so on. Moreover we use drawings to explain the *how* and the *why* of things, to identify parts and to define terms, and to show the economic significance of the products of technology. It is just as important for us to know how to use and to conserve things as it is to know how to produce them. The extent to which drawing is used by the American public is indicated by the frequency with which it appears in our textbooks, magazines, newspapers, sales and service manuals and so on.

People in many different walks of life use drawing in some of their life situations. The farmer finds drawing useful in mapping his fields in crop rotation. In the recent wheat allotment campaign he was required to make a simple map to show his wheat acreage. The navigator uses charts and maps to chart his course. The forest ranger uses diagrams to locate forest fires. The airplane pilot uses maps and charts in flying. The musician uses diagrams in learning to play certain instruments and his music is really a diagram of notes, bars, and scales. The executive uses diagrams to chart his staff and to present

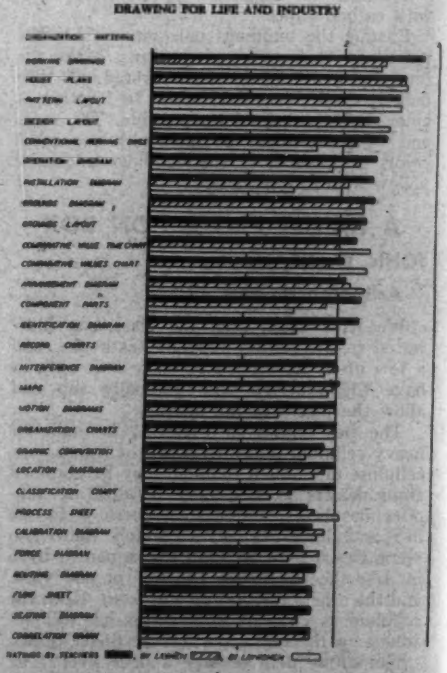


Fig. 1. How drawings are rated

visual aids to his board of directors. The scientist uses drawings to analyze and explain physical, chemical and other phenomena. The student uses drawings in many of his learning situations. The landscape gardener, the interior decorator, the sign painter, the movie director, and many others make frequent use of drawings, and engineers, mechanics, and artisans find constant use for this means of expression.

In a bulletin published in 1941 by the Wisconsin Department of Education, emphasis was placed upon the selection of course content in drawing on the basis of the *life situations* of the *ordinary individual*. It gave a comprehensive list of such situations as suggested by a large group of teachers from Wisconsin and other states as procured and edited by a committee from the Wisconsin Industrial Arts Association, who sponsored the study.

Some 185 life situations in which some phase of drawing would be useful were identified by the committee and published in the bulletin. These were analyzed and classified into thirty different groups or *organization patterns*. The forms or patterns which are used to organize or systematize material may be termed *organization patterns*. Every relationship may be organized into units of some kind, which will be related by a common bond or characteristic, and in accord with some definite plan or *organization pattern*.

Various media of expression such as English, music, art, drawing and so on, each have their characteristic forms or patterns whereby related material is organized or systematized. That each type of expression has several distinctive forms is indicated by the fact that each separate form has been given a special label or name and that many of these are of current usage by individuals who are active in these fields of expression. In English we have various forms indicated by such terms as ode, sonnet, theme, drama; in art we recognize such forms as still life, landscape, portrait; while in music we designate various forms by terms such as rondo, scherzo, symphony, and so on.

A drawing is a graphic systemization of a set of relations, of which there are many different types, each showing a characteristic set of relations. In drawing, as in the other types of expression before mentioned, we may identify several kinds of *organization patterns* because they are of such common use that names have been applied to them such as maps, flow sheets, working drawings, operation diagrams, correlation graphs and so on.

Using the list of *organization patterns* compiled by the Wisconsin Industrial Arts Committee as a basis, an investigation was recently made to determine the comparative usefulness of these various *organization patterns* to the general public. A representative cross section of the public was interviewed by mail. Some 503 responses were received from the male populace, 171 from the female populace and 89 from instructors of drawing in Wisconsin. A graphic comparison of the relative values is shown in Figure 1.*

An examination of this chart reveals that while working drawings were given the highest rating by the instructors in drawing, several other types of *organization patterns* were given ratings as high or even higher by the male and female populace.

The findings of this investigation as indicated in Figure 1, should be quite significant for teachers of drawing and for others upon whom falls the responsibility for selecting course content in drawing. Course offerings and objectives should be critically evaluated. Drawing courses should not only emphasize the function of drawing which is used to record visual impressions, but should also consider it as a vehicle for logical analysis, and as a supplementary language vehicle.

Drawing would now assume a new meaning. If all implications are carefully weighed, it may be rightfully assumed that drawing should be offered to all students as a general subject in the lower secondary school. It should no longer be considered simply as a shop adjunct but as a language subject useful to all, and since it is useful to many individuals in different walks of life, course offerings should be patterned more closely to the life situations of the ordinary individual.

*From *Drawing for Life and Industry* by Daniel Green, published by The Bruce Publishing Co., Milwaukee, Wis.

References

Source Material Guides for Course of Study Planning in Drawing for Wisconsin Schools. Published and issued by John Callahan, State Supt., Madison, Wis.

Practices and Needs in General Drawing-Traditional and Proposed Content, Palmer O. Johnson, master's thesis, Stout Institute, Menomonie, Wis., 1941.

MURAL MAP SHOWING RELATION OF PRINTING TO OTHER INDUSTRIES

BERNARD J. HESS

Eastwood High School

Syracuse, N. Y.

The mural map in the print shop at Eastwood High School, Syracuse, N. Y., shows the location of manufacturing, lumbering, mining, and agricultural industries supplying products used by printers.

Illustrated, too, are the industries of transportation, important printing centers, and the government printing office.

One side panel depicts the historical sequence of printing inventions, beginning with the first printing press down to the present typesetting machines and high-speed presses. The other panel illustrates the number of people engaged in the printing fields, the value of the products, and the number of printing establishments. In the shop, this mural presents a graphic picture of the commercial and economic interdependence which exists between printing and other industries.

This project is a good example of coordinated industrial-arts planning. The information was gathered by the printing students, the actual mapping and coloring by the students in the drawing classes, the framing by the woodshop students, and the spraying by the students in the auto shop.

Mural map showing relation of printing to other industries

The mural framed on the wall in the shop provides handy reference for the students, and illustrates an over-all picture of the magnitude of the industry which they are exploring.

AN AMUSING HAT RACK

HAZEL F. SHOWALTER

Davenport, Neb.

The hat rack shown in Figures 1 and 2 stands on a shelf to hold two hats. It may be made from a piece of ½-in. white pine 8 in. wide by 3 ft. long. If ⅜-in. plywood is available, it should be used for the shape of the cat, and the mortises made in the half-inch base and hat rests to fit it.

Materials:

Base, ½ by 7 by 16 in., white pine.

Shape of cat, ½ by 7½ by 15 in., white pine, or it may be cut from ⅜-in. plywood.

2 round hat rests, ½ by 4 in., white pine, with the upper edges rounded.

Cut a mortise in the base to fit the tenon on the lower edge of the figure of the cat.

Cut a mortise on the under side of each hat rest to fit the tenons at the upper edge of the figure of the cat.

Fasten the 3 mortises with glue and brads.

Possible color schemes:

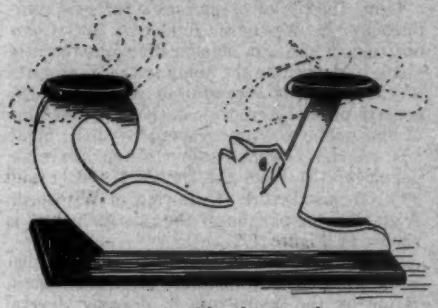


Fig. 1. The hat rack

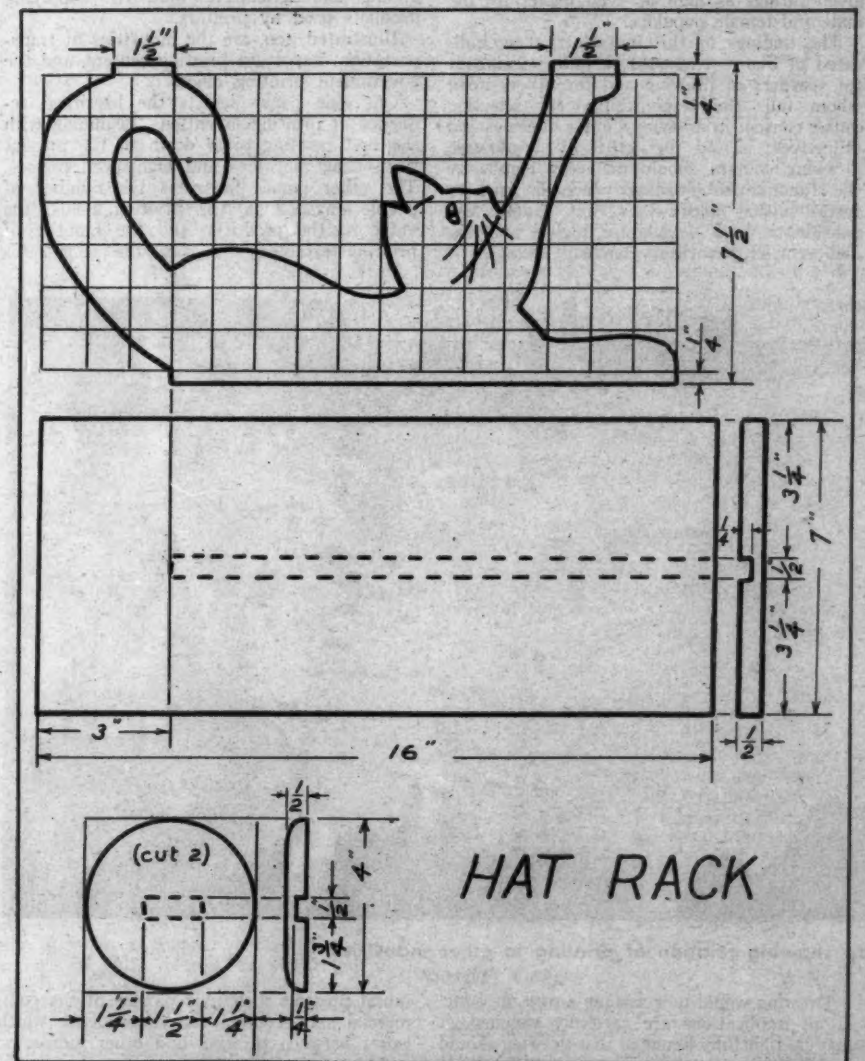


Fig. 2. Details of hat rack

Glue, 1-in. brads.

Saw out the 4 pieces.

Round the upper edges of the 2 hat rests.

White cat with base and hat rests of any light color.

Yellow cat, black or dark brown base and hat rests.

Pale gray cat, rose, pale green, or lavender base and hat rests. The marks for the face of the cat may be black or dark brown.

ORNAMENTAL TIN CRAFT

CHRIS H. GRONEMAN

Industrial Education Department

A. & M. College of Texas

College Station, Tex.

(Continued from page 323 of the September, 1945, issue)

Nut Scoop

Scoops are interesting pieces of tin craft to add to the usual line of table appointments. This provides a small project for the craftsman to make for presents or favors at a party. With an initial pierced in the handle the nut scoop becomes a most attractive, individualized, little article which will be welcomed by any lady.

Nut scoop

It is particularly appealing in either bright or antique copper finish. Many processes of tin craft are employed in the making of this unique project. The material should be of double thickness stock. Forming of the scoop can be successfully done in a hollow opening of a block, or a block may be grooved to the exact fit.

BILL OF MATERIAL FOR DESIGN A

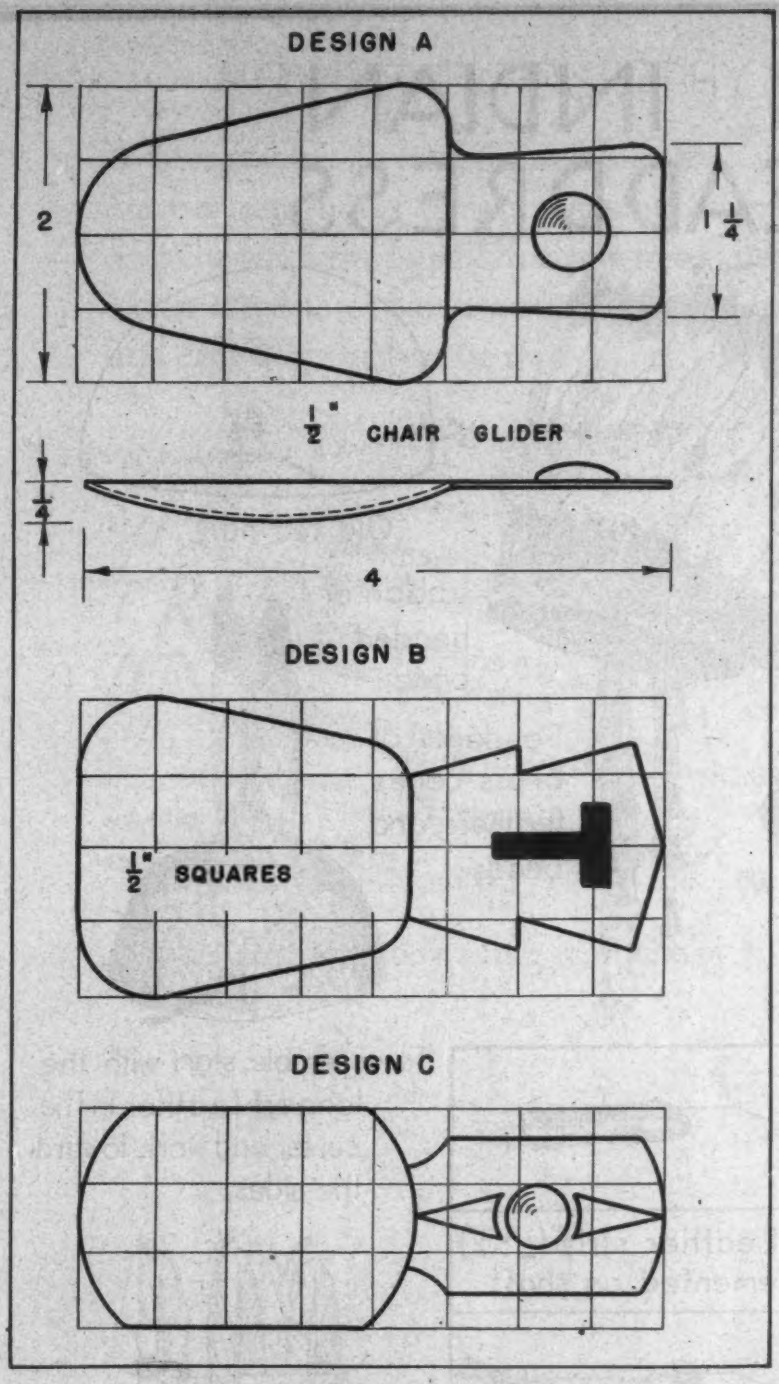
No. of pieces	*Item*	*Size*
2	Sheet tin	2¼ x 4¼
1	Chair glider	½
	Solder, flux, steel wool	

Tools:

Alcohol burner, asbestos sheet, brush, carbon paper, copperplating setup, emery cloth, files, forming block, flat iron, heating device, jewelers' frame and blade, lead or wood block, lead weight, peening hammer, pencil, rule, scriber, soldering copper, tempera water color paint — yellow, and tin snips.

Procedure:

1. Use the design as shown, or develop an original design.
2. Cut out 2 pieces of tin stock.
3. Solder one side of each piece.
4. Sweat both pieces together with hot flat iron. Weight the soldered parts together immediately as more is sweated.
5. Apply coat of yellow tempera water paint to one side of sweated piece for design transfer.
6. Lay design sheet and carbon paper over painted portion and trace design.
7. Cut out nut scoop with jewelers' saw.
8. File and dress edges with emery or metalite cloth.
9. Form scoop with peening hammer and forming block.
10. Peen surfaces of handle.
11. Remove prongs from chair glider, file edges.
12. Apply solder on edge of glider.
13. Sweat-solder glider in place with alcohol torch.
14. Rub nut scoop with steel wool and prepare for plating.
15. Apply thick coating of copper.
16. Polish project with steel wool. Use cloth to prevent touching metal with hands.
17. Apply coat of clear metal lacquer and allow to dry.



Various designs of nut scoops

CHECK YOUR FIRE EXTINGUISHERS

Hand fire extinguishers must be kept ready for instant use or they may fail to operate properly when needed. To maintain them in good working order, they must be inspected frequently, refilled immediately after use, and thoroughly serviced at least once a year.

The annual servicing may be carried on throughout the year by a few experienced men, who also take care of recharging. If a large number of extinguishers is involved, the work can be done at one time by a group especially assigned to this duty. In no case should so many extinguishers be removed for servicing at the same time as to leave any area without protection.

Soda acid and foam extinguishers must be recharged annually, if they have not been used and refilled in the meantime. Other types are recharged only after use. The tag attached to each extinguisher should show the last date of recharging or annual servicing. Only replacement parts or recharging materials made by the manufacturer of the extinguisher being serviced should be used.

The servicing procedure for each type is as follows:

Vaporizing liquid: Test the action by pumping some of the contents into a clean, dry container, and return the discharged liquid. In the case of the pump-gun types, add more liquid, if necessary, to bring the level to within half an inch of the top. In servicing the stored pressure type, bring the liquid to the proper level and be sure to replenish the air pressure.

Never recharge a vaporizing liquid extinguisher with ordinary carbon tetrachloride or use water to test operation, as either will cause corrosion. Do not lubricate any part of the extinguisher.

Soda acid: Be sure the nozzle opening is clear; then invert the extinguisher and discharge the contents. Unscrew the head and examine the gasket, which should be replaced if it is damaged or badly worn. Remove the cage containing the acid bottle, putting aside the stopple for later replacement. Make sure all the extinguisher parts are kept together so that they may later be returned to the respective units from which they were removed originally.

Rinse the extinguisher shell thoroughly with warm water, draining it through the hose. Open clogged holes in the hose strainer with a piece of wire. Replace the hose and nozzle, if badly worn or damaged.

Dissolve the dry chemical in lukewarm water, according to directions on the recharge package. Pour the solution into the extinguisher shell, and bring to the filling mark by adding water. Remove the cork from the new acid bottle and replace it with the stopple from the old bottle. Replace bottle and cage in the extinguisher neck. (If any acid spills on the skin or clothing, wash it off with water.) Rub a little vaseline on the shell threads and replace the head, using only hand power. Be sure that the gasket fits snugly against the shell neck.

Caution: If the extinguisher looks badly dented, or the seams appear weakened, do not discharge. Instead, remove the head and pour out the contents. Return to the manufacturer or his agent for repair.

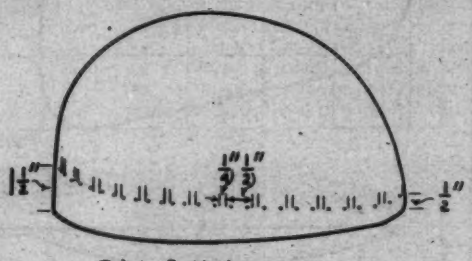
Foam: As in the case of the soda acid, discharge by inverting. Remove the head and lift out the inner tank. Rinse the extinguisher thoroughly, draining water out through the hose. Dissolve the charging material according to instructions on the packages, using hot water for the A charge and lukewarm water for the B charge. Pour solution A into the inner cylinder and solution B into the outer tank, bringing both up to the filling marks by adding water. Replace the stopple on the inner tank and return it to the extinguisher shell. Replace the head, as for the soda acid.

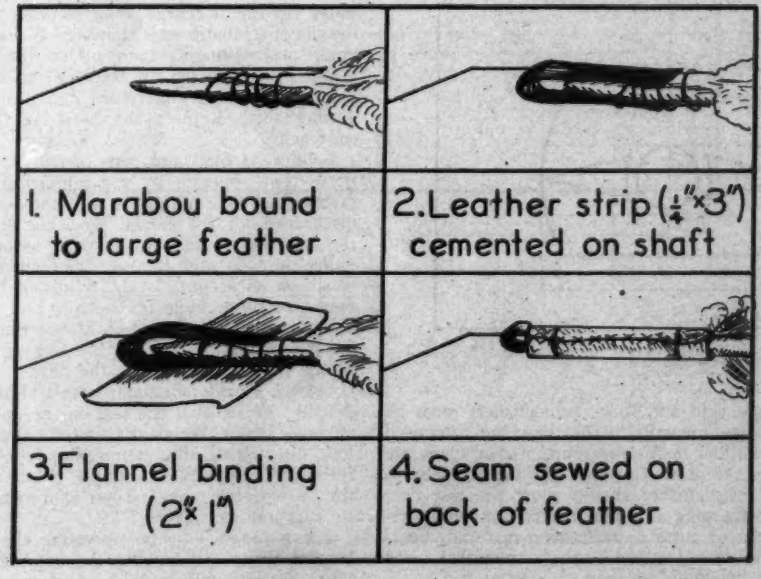
Loaded stream and *gas cartridge:* Since these types operate by gas released from a carbon dioxide cartridge, they should not be discharged for the annual servicing. Remove the head gasket and inspect parts as outlined under the soda acid. Remove the cartridge and weigh on an accurate scale. A loss of half an ounce or more indicates leakage and a new cartridge should be inserted. If necessary, add water to bring the liquid in the tank up to the filling mark. Then replace the head.

Carbon dioxide: Examine hose and horn for defects and see that the seal on the operating valve is intact. Weigh the unit. If there is a loss of weight, the extinguisher should be recharged. Recharging service is offered by the extinguisher manufacturer or his agents or by carbonic gas plants.

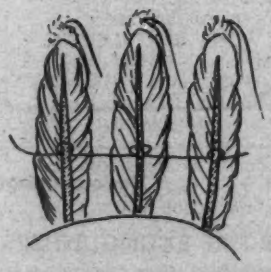
Pump tank: Test by operating the pump several times, discharging the solution back into the extinguisher tank. A drop of thin lubricating oil may be placed on the piston rod packing. Bring up to the filling mark by adding water, if necessary. — Safety Research Institute, Inc., 420 Lexington Ave., New York 17, N. Y.

AN INDIAN HEADDRESS





To assemble, start with the longest feather in the center and work toward the sides.

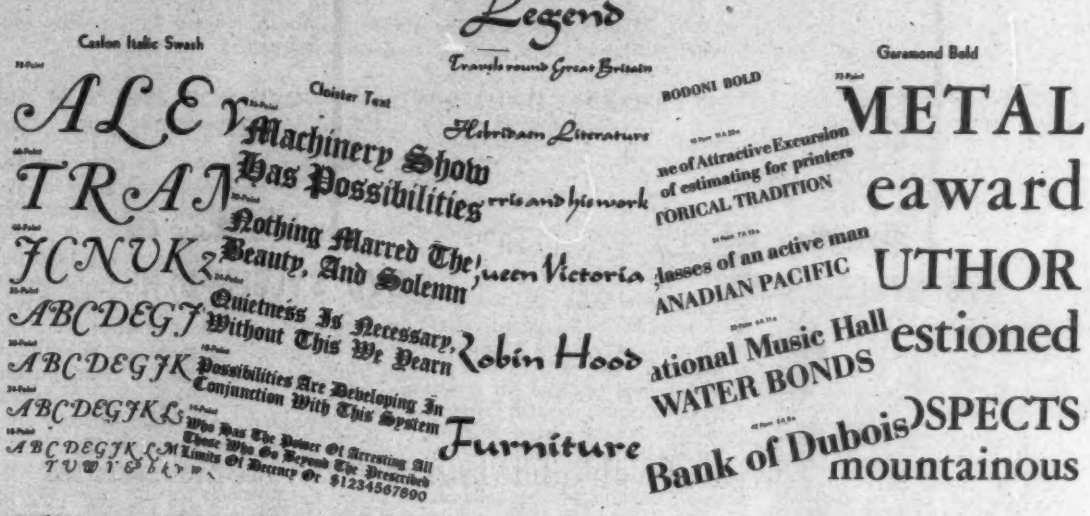


Inner lacing thread

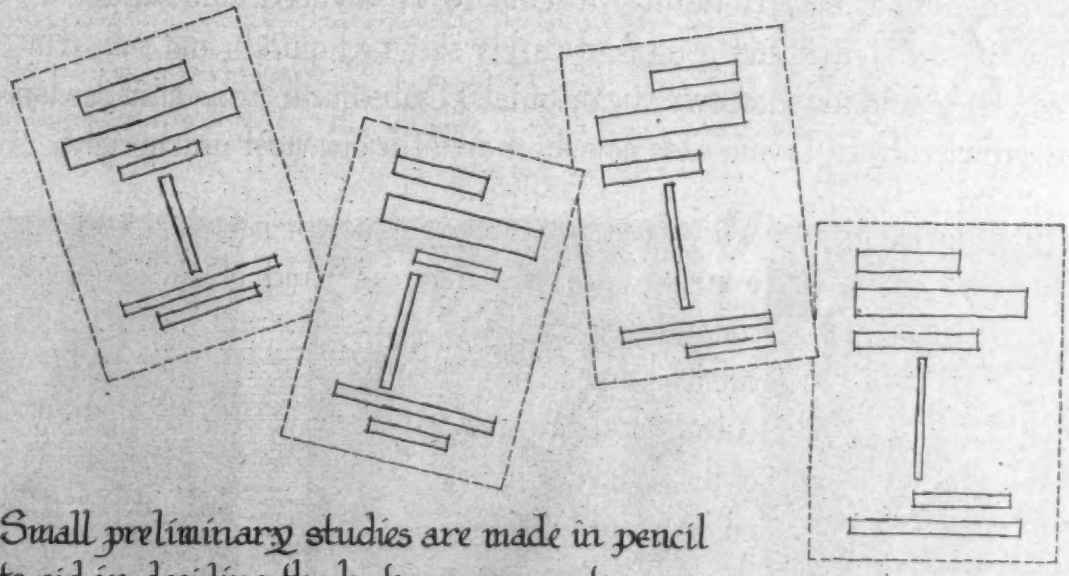
Indian headdress submitted by Louis V. Newkirk, director of industrial arts, Chicago, Ill.

HOW IS TYPOGRAPHY DESIGNED?

A typographic layout is the design for a piece of printing. The typographer may, under some circumstances, prefer to do his thinking directly with the type. This practice is usually less practical and economical than planning on paper. The designer must know sizes and details of the type he plans to use, and be able to letter them well.



The designer will have many resources of type catalogs and display sheets.

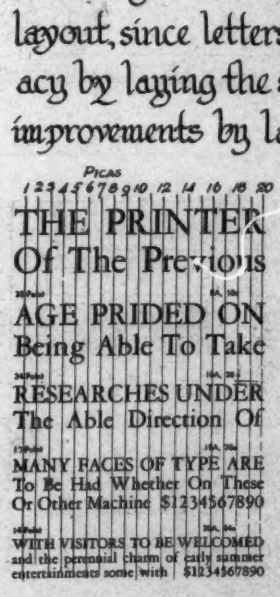


Small preliminary studies are made in pencil to aid in deciding the best arrangement.

Plate 62. Design course by Burl N. Osburn, director of industrial arts, State Teachers College, Millersville, Pa.

TYPOGRAPHIC LAYOUT (Continued)

A full-size sheet is prepared, with guide lines for lettering, first sketched in place free hand, then accurately drawn to type sizes with a T-square. Lettering may be traced from the catalog and transferred to the layout, or it may be drawn freehand. Tracing paper is a good material for a layout, since letters and ornament can be sketched quickly and with accuracy by laying the sheet over the originals. Subsequent trials may develop improvements by laying each new sheet over the one most nearly right.


Picas
1 2 3 4 5 6 7 8 9 10 12 14 16 18 20
THE PRINTER
Of The Previous
AGE PRIDED ON
Being Able To Take
RESEARCHES UNDER
The Able Direction Of
MANY FACES OF TYPE ARE
To Be Had Whether On These
Or Other Machine $1234567890
WITH VISITORS TO BE WELCOMED
and the perennial charm of early summer
entertainment some with $1234567890

When body type is used in book or pamphlet work, the average number of characters per inch of line can be estimated from type-catalogs, and an accurate calculation made of the number of lines on each page. A full dummy is then made.

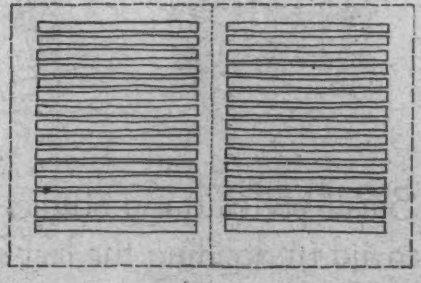


Plate 63. Continuation of design course by Burl N. Osburn, director of industrial arts, State Teachers College, Millersville, Pa.

PROJECT PLANNING SHEET

The Laboratory of Industries
Teachers College of Connecticut
New Britain, Connecticut

Approved by .....
Project Grade .....

Name ..... Grade ..... Date .....
Name of project ..... Activities in ..... and .....
My idea came from ....
reference *author* *page*

Make a working drawing of your project on this sheet. Mark all *dimensions carefully. Use a pencil and ruler.*

Bill of Material

Name of part	*No. of pieces*	*Size T x W x L*	*Kind of material*	*List price*	*Cost*

Date of Completion ..... Date of payment ..... Total cost .....

STUDENT RATING SHEET

The Laboratory of Industries
Teachers College of Connecticut
New Britain, Connecticut

Instructor .....
Name of Course .....
Name of Student ..... Date .....

Highest possible score	*Student's self-rating score*	*Instructor's score*	*Scoring based upon:*	
55			Projects	(a) Quality of workmanship (b) Amount of work accomplished (c) Number of advanced processes completed
10			Planning Sheets	(a) Completeness of details (b) Quality of drawings (c) Accuracy in computing bills of material (d) Originality of ideas, etc.
10			Class Attitudes	(a) Interest (b) Initiative (c) Co-operation (d) Respect for rights of others, etc.
10			Shop Organization	(a) Proper use of equipment (b) Fulfillment of cleaning responsibilities (c) Return of tools and materials to proper locations (d) Respect for rules of safety, etc.
15			Written Work	(a) Knowledge of subject matter (b) Related informations acquired (c) Correct usage of laboratory terms (d) Thoroughness of study, etc. (Including term paper and final examination)
100			Total score is found by adding individual scores	

Student rating and project planning sheets submitted by Paul N. Wenger, Associate Professor of Industrial-Arts Education, Teachers College of Connecticut, New Britain, Conn.

EQUIPPING STUDENTS FOR PROFICIENCY AND HAPPINESS

Every now and then we hear someone advocate that the secondary school should confine its program to the "fundamentals." Fundamentals are sometimes contrasted with fads and frills in education. The only intelligent thing for education to do is to attempt to carry out a program that will equip persons for proficiency and happiness in the desirable activities of life as we know them today. We must educate for conditions as they are, and when conditions change, we shall be able to change with them. People learn specifically, not generally; therefore, our program of education must deal with specific learnings, realizing that it is easier to change from something to something than it is to change from nothing to something. We should have faith in a well-ordered, man-purposed, and man-directed change. — *R. H. Woods.*

The property damage caused by motor vehicle accidents in 1944 amounted to $550,000,000, according to estimates by the National Safety Council. — *Safety News.*

WHITTLING-JACKKNIFE TECHNIQUE

W. BEN. HUNT

Hales Corners, Wis.

(*Continued from page 317 of the September, 1945, issue*)

Zebra Colt

The little zebra colt shown in Figure 184 presents a rather simple job of whittling. With the grain running up and down, the legs are not hard to shape. After the silhouette is sawed, pencil on the legs and then block out the entire figure; that is, shape every part of it in squared areas instead of rough rounded areas. The measurements are easier to get that way. The rounding up and finishing is rather simple and the final finishing is, of course, done with sandpaper. See Figure 185.

Now give the entire figure a coat of Chinese white water color and let it dry. If you are not too sure of yourself it is suggested that some of the stripes be penciled before painting, although you need not be too concerned about the exactness of the stripes as no two zebras are marked exactly alike. See Figure 186.

For the striping use a good black water color and mix it so that it is not too thin. It will be noticed that the stripes meet down the center of the back and belly. As you paint in a stripe on one side, paint a corresponding stripe on the other side also. The final finish should be a coat or two of clear lacquer. Shellac and varnish have a tendency to yellow the white somewhat, and while the white stripes are not clear white in objects of this kind, pure white and good solid black are preferred.

Fig. 184

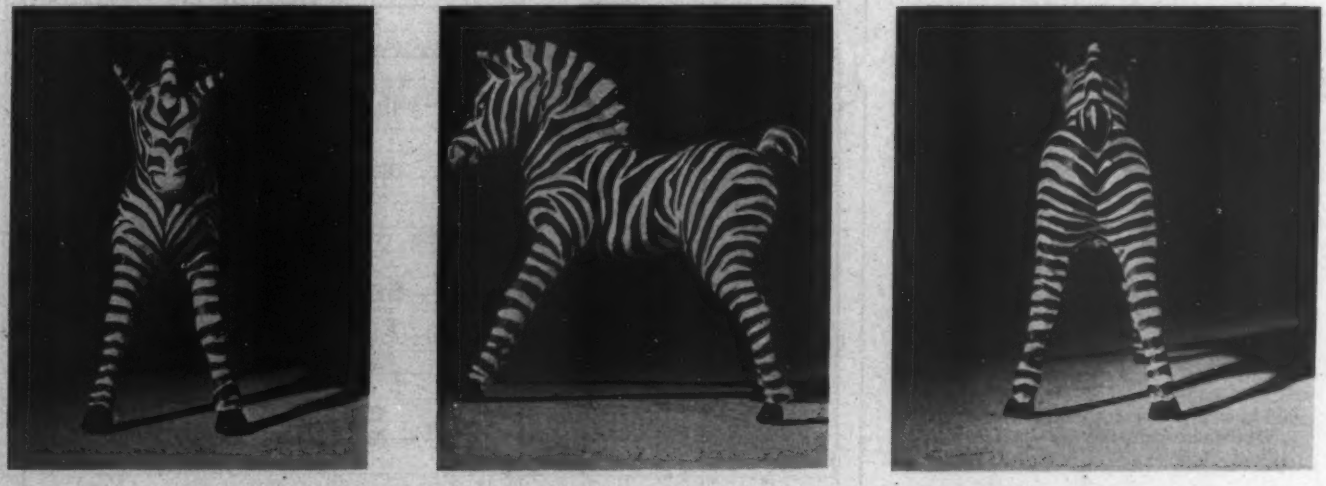


Fig. 186. Front, side, and rear view of zebra colt showing how it is to be painted

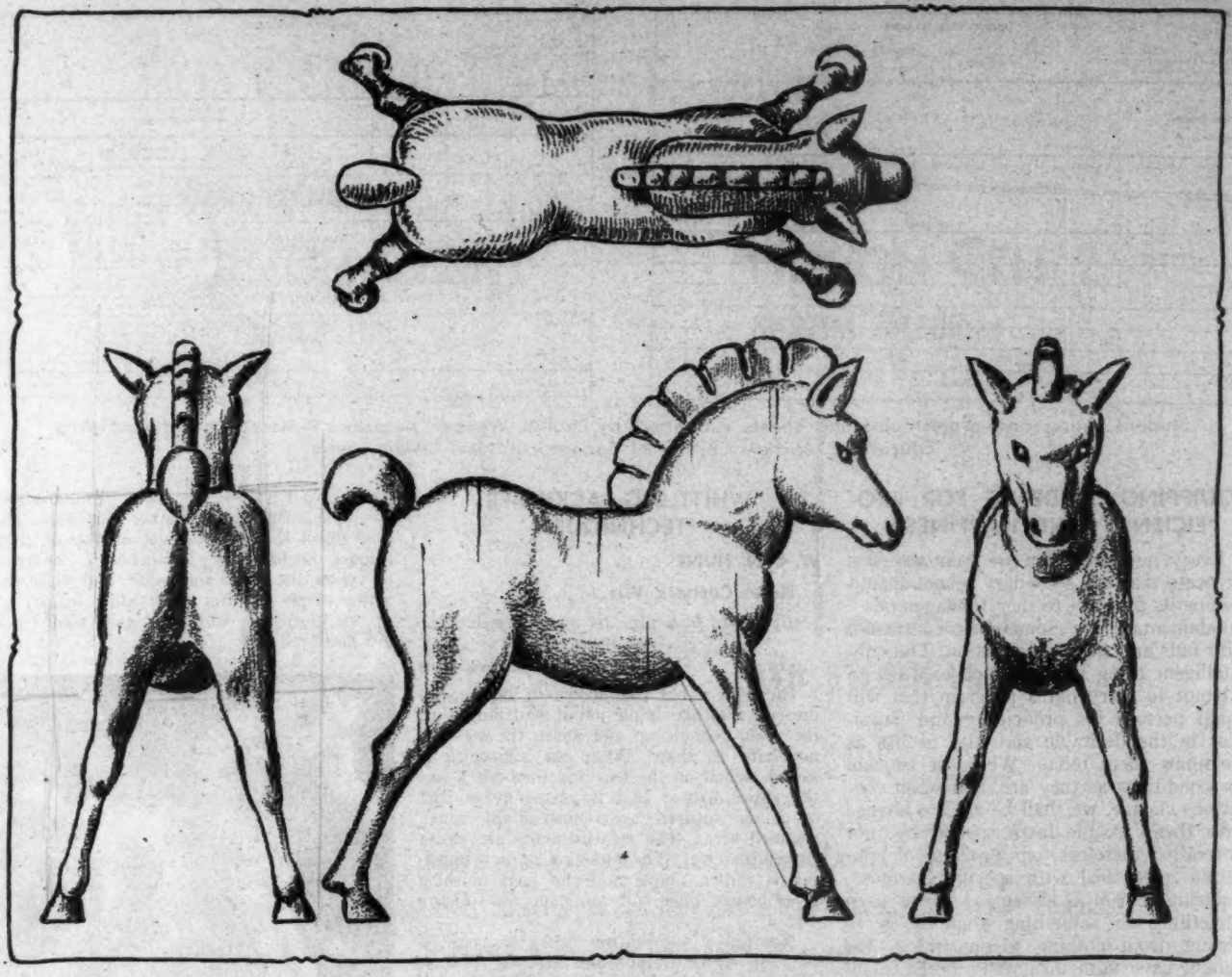


Fig. 185. Full-size pattern of the zebra colt

STEEL SQUARE

GEORGE F. LARTZ

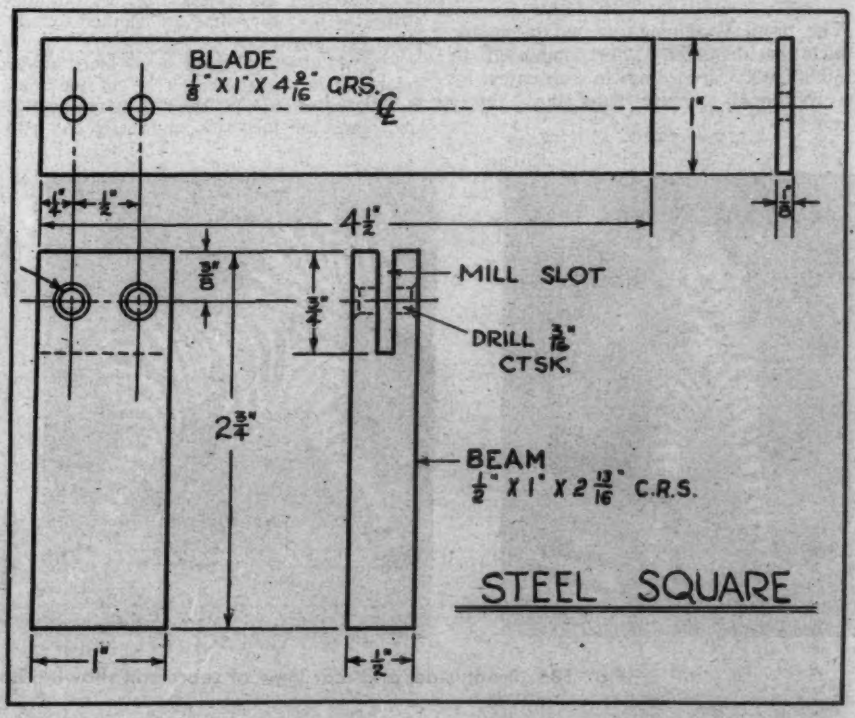
High School

Frederick, Md.

Requiring utmost care in layout and in bench work this simple machine-shop job tests a boy's inclination for metalworking. Made from cold rolled steel highly polished this tool is a valuable addition to any toolbox. Extreme patience is necessary for accuracy, the blade and beam must be square, and the rivet heads draw filed smooth with the surface for a well-made project. Used successfully as a beginning machine-shop job for several years the steel square shown was made by a tenth-grade high school boy, and the following general steps were used:

Making the Beam

1. Get out stock from bar of cold rolled steel and square ends to length.
2. Make layout for slot.
3. Mount in milling machine and cut ⅛ by ¾-in. slot which must be square with ends.
4. Lay out and center punch rivet holes.
5. Drill and countersink 3/16-in. holes.



6. Clean off burrs, stamp initials on bottom, and polish.

Making the Blade

1. Get out stock from bar of cold rolled steel.
2. Square up ends to length.
3. Polish.

Assembly

1. Insert blade in beam.
2. Clamp blade and beam against drill press vise jaws and drill 3/16-in. holes.
3. Use 3/16 by 5/8-in. steel rod for rivets (welding rod works nicely), and fasten blade to beam.
4. Draw file rivet heads until surface is smooth and all indication of rivet removed.
5. Turn in for instructor's inspection.

Final Check

1. Is blade and beam square?
2. Are rivet heads polished smooth with beam surface so that they do not show?

DONT'S FOR EMPLOYERS

1. *Don't* regard physically handicapped workers as requiring, nor do they want, special privileges. "They want to stand on their own feet (whether they have them or not!)." They just want to be "one of the gang."

2. *Don't* consider every physically handicapped person assigned to a job in your plant in terms of what he can't do, but of *what he can do*. Emphasize his qualifications, not his limitations.

3. *Don't* stereotype handicapped workers. They should be handled on an individual basis. This should apply to other applicants as well, for they present the same individuality of problems.

4. *Don't* judge a physically handicapped person's abilities by his appearance. The work he is *able to do* is of most importance. Sometimes a physical handicap can be turned into an asset and persons may be better workers because they are handicapped, i.e., workers with impaired hearing are not disturbed by noisy machinery, and blind workers have extreme delicate sense of touch.

5. *Don't* regard handicapped workers as more accident prone, a burden on your safety program or a cause for increase in the Workmen's Compensation Insurance premiums. One of the largest insurance companies states: "It has been frequently assumed that companies writing Workmen's Compensation Insurance increase the premium when the physically handicapped are employed. *This is not a fact.* Rates are based on the experience of your class of industry and modified in most cases by your plant experience."

Many plants, as Western Electric, Caterpillar Tractor, Ford, and others have found that resignations, absence due to sickness, and discharges for cause, were much lower among the handicapped. Quite significant also is the much lower percentage of accidents among those who have been previously disabled.

6. *Don't* transfer any physically handicapped worker to other work; that is, from the job on which he was originally placed, without the approval of the person in charge of job placement, nor without the approval of the physician in some cases.

7. *Don't* give a narrow meaning to the term —physically handicapped worker. Nearly every person has at least one physical handicap of some kind. For example, one may be a good short distance runner, but not a mile runner. One may be a good machine operator, but could not paint a flag pole. One person may be a very good inspector but a mediocre bench worker, and vice versa. This is really "old stuff" because nearly everyone from the foreman on up, has had to assign people to various jobs on the basis of what they knew persons could or could not do. Hence, many have had more experience in handling handicapped workers than they really realize. The only difference is that some may have more obvious limitations of their physical ability which need proper consideration in their placement and supervision.—*Missouri Schools.*

Relationship of Skills To Projects	Job No. 1	Job No. 2	Job No. 3	Job No. 4	Job No. 5	Job No. 6	Job No. 7	Job No. 8	Job No. 9	Job No. 10
1. Lay of and use of type	•	•	•	•	•	•	•	•	•	•
2. Setting type in stick	•	•	•	•	•	•	•	•	•	•
3. Justifying a line	•	•	•	•	•	•	•	•	•	•
4. Dumping a stick	•	•	•	•	•	•	•	•	•	•
5. Spacing out a job	•	•	•	•	•	•	•	•	•	•
6. Tying a form	•	•	•	•	•	•	•	•	•	•
7. Proofing a job	•	•	•	•	•	•	•	•	•	•
8. Making corrections	•	•	•	•	•	•	•	•	•	•
9. Reproofing a job	•	•	•	•	•	•	•	•	•	•
10. Getting instructor's O.K.	•	•	•	•	•	•	•	•	•	•
11. Printing on proof press	•	•	•	•	•	•	•	•	•	•
12. Wash form	•	•	•	•	•	•	•	•	•	•
13. Distribution of type	•	•	•	•	•	•	•	•	•	•
14. Distribution of leads and slugs	•	•	•	•	•	•	•	•	•	•
15. Care of string	•	•	•	•	•	•	•	•	•	•
16. Centering a line of type	•									
17. Setting uneven lines		•								
18. Use of borders			•							
19. Novelties in printing				•						
20. Paragraph composition							•			
21. Marking corrections							•			
22. Making corrections by overrunning							•			
23. Setting of poetry						•				
24. Use of monograms					•					
25. Use of letterheads					•					
26. Corner envelope composition					•					
27. Use of initial letter							•			
28. Alignment of type								•		
29. Clean a case									•	
30. Use and care of materials	•	•	•	•	•	•	•			
31. Related knowledge	•	•	•	•	•	•	•			

Chart showing relationship of skills to projects submitted by Norman Crouch, Maine Township High School, Park Ridge, Ill.

PAYING THE PRICE

A man, to whom success had come solely as the result of his own persistent efforts, always kept in a prominent place above his desk a card which contained seven questions:

1. You want success, but are you willing to pay the price for it?
2. How much discouragement can you stand?
3. How much bruising can you take?
4. How long can you hang on in the face of obstacles?
5. Have you grit enough to do what others have tried to do and failed?
6. Can you go up against skepticism, ridicule, friendly advice to quit, without flinching?
7. Are you strong at the finish as well as quick at the start?

—*Vocational Education Newsletter*, Pittsburgh, Kans.

TOOLMAKER'S LEVELING JACK

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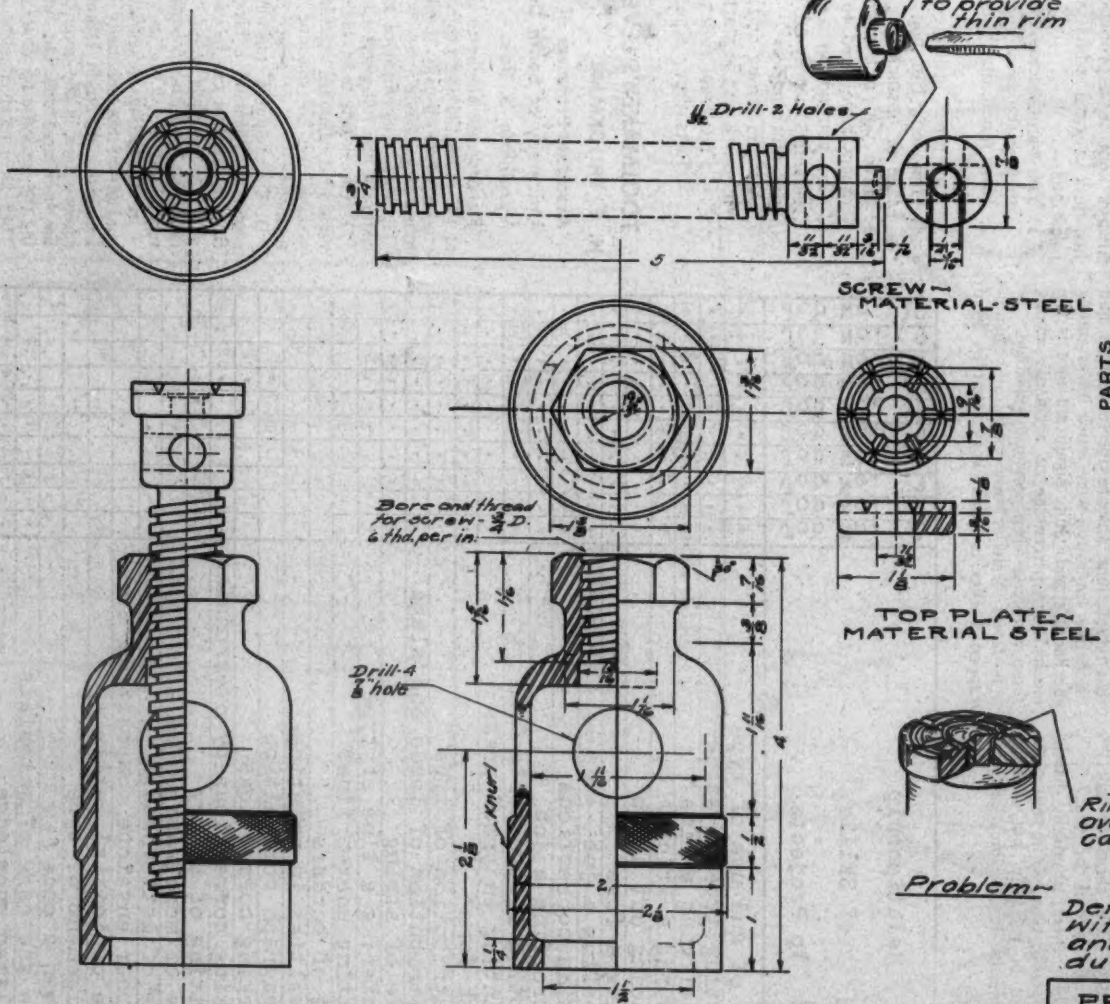
Those people having to do with the layout of the industrial-arts projects for high school students are usually confronted with the following problems:

1. The development of a design which will command the full interest of the student.
2. The design must include a fairly large variety of standard machine-shop operations making use of machine tools and bench methods.
3. The required machine-shop operations should not demand a higher degree of skill than the student can be expected to have.
4. The materials required should not be too expensive and they should be readily obtainable.

In conducting industrial-arts training for students of the university high school at the University of South Dakota, the small jack screw shown in the accompanying illustration has been used with fair success. Students doing the work are members of our junior class. They have received some training in the use

TOOLMAKER'S LEVELING JACK


Bore plug with flat drill to provide thin rim
½ Drill-2 Holes
SCREW ~ MATERIAL-STEEL
TOP PLATE ~ MATERIAL STEEL
Bore and thread for screw - ¾ D. - 6 thd. per in.
Drill-4 ⅛ hole
Knurl
BODY ~ MATERIAL-STEEL
GENERAL ARRANGEMENT

STUDENT			
GRADE		OPERATIONS	TIME
PARTS — BODY	5-10	BORE TO DIMENSIONS	
	4-8	FORM OUTSIDE	
	2-5	FINISH AND KNURL	
	7-12	THREAD FOR SCREW	
	5-11	MILL HEXAGON	
PARTS — SCREW			
	4-7	TURN TO DIMENSIONS	
	6-12	CUT SQUARE THREAD	
	3-4	FINISH HEAD	
	3-6	DRILL CROSS HOLES	
PARTS — TOP PLATE			
	2-4	TURN TO DIMENSIONS	
	3-7	FACE, GROOVE AND DRILL	
	3-5	CUT OFF	
	4-8	FILE CROSS GROOVES	
ASS'MB'Y			
	1-3	FASTEN HEAD ON SCREW	

_____ TOTAL GRADE FOR WORK QUALITY %
DEDUCTION OR ADDITION FOR TIME CONSUMED % ____
PROJECT GRADE ____ %

Rim turned over in such manner as to avoid expanding the plug and causing it to be tight in the hole through the top plate

Problem~

Determine the lifting power of the jack with given pull on lever of given length and calculate the percentage of loss due to friction. (Requires Testing Machine)

PROJECT FOR ELEMENTARY MACHINE TOOL PRACTICE
DRAWN BY J.E. Brockman
TRACED ~ V.D. Young
Scale ~ Full Size. Date 3/7/44

of woodworking and forge shop tools before undertaking this project. The project has been designed with the idea of supplying a number of very elementary operations with metalworking tools before undertaking the cutting of threads and doing the more difficult jobs.

All material used is of ordinary bar steel stock. The bodies are made from pieces of 2¼-in. free cutting screw stock. Material of this sort may be easily secured at a low price whenever automatic screw machines are operated as the collets of these machines will not properly hold shorter pieces and these lengths represent the waste of each bar fed into the machines. The screw and the cap are made from pieces of mild steel which may be secured from any salvage stock.

The project as a whole includes turning, boring, milling, knurling, drilling, inside and outside thread cutting, and a certain amount of filing and hand fitting. The projecting end of the screw which holds the cap in place is bored in such manner as to provide a thin rim indicated by the rough sketch. After the cap is in place the rim is turned outward with a ball-peen hammer, care being taken not to set the edge hard against the cap which would prevent it from turning freely.

The grading of machine-shop projects produced by industrial-arts students often presents the problem of grading a number of detailed operations. Too often these grades are based upon the apparent work of the finished product, the student in many cases having received considerable assistance from the instructor in performing operations with which he has had trouble. The plan indicated in the table to the right of the working drawing aims at classifying the operations, grading them individually, and totaling the individual grades for the final project grade. Certain operations, as, for example, cutting the square thread on the screw or in the body, are given a heavier weight than the drilling of the cross holes. Of the two columns of figures, those at the right represent the grades to be applied to work of the highest class in performance of each of the operations; those at the left represent grades which would in each case be applied to only passing work. The work of the usual student will for each operation entitle him to a grade somewhere between the two, depending upon the judgment of the instructor. The sum of the grades allowed is the total grade for the quality of work. Some students work at a more satisfactory rate than others, giving more thought to the problems at hand and requiring less attention from the instructor. Credit should be allowed for this ability and the plan shown provides for this by a small percentage to be added or deducted from the quality grade according to the instructor's judgment to form the final project grade.

As related work in the field of elementary physics, the theoretical lifting power of the jack is determined. Its actual lifting power is also determined by the aid of a tensile testing machine and the loss due to friction between moving parts noted.

SHOP CHECK-IN AND APRON PROBLEM

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Proper shop attire is one of the major concepts in shop safety. Check-in, commonly known as taking attendance, is one of the

Apron rack

Aprons housed in tool room

onerous duties of the instructor. Both of these factors steal time from work and instruction. Duplication of effort and loss of time is true regardless of the length of period, but one is more keenly aware of this time in those schools where the period of shopwork is 40 to 90 minutes' duration. The system described herewith reduces the time loss involved and eliminates the duplication of effort.

We purchased a set of uniform aprons to cover our largest class size. Although there was no school appropriation for this, we utilized part of a revolving shop fund which is available to most shops. These aprons were stripped of *all* pockets as our experience has taught us that besides being a hazard, they act as a repository for mislaid keys, small tools, and no end of rubbish.

On the bib of these aprons we stenciled a 5-in. disk of contrasting color to the apron, using the silk-screen process for this purpose. Superimposed upon this disk we stenciled numbers from 1 to the highest class enrollment. At the same time each class seating plan was numerically marked so that the transaction of number to name and vice versa could be easily made. This was found to be of great value particularly at the beginning of the semester. It made for the speedy identification of each pupil.

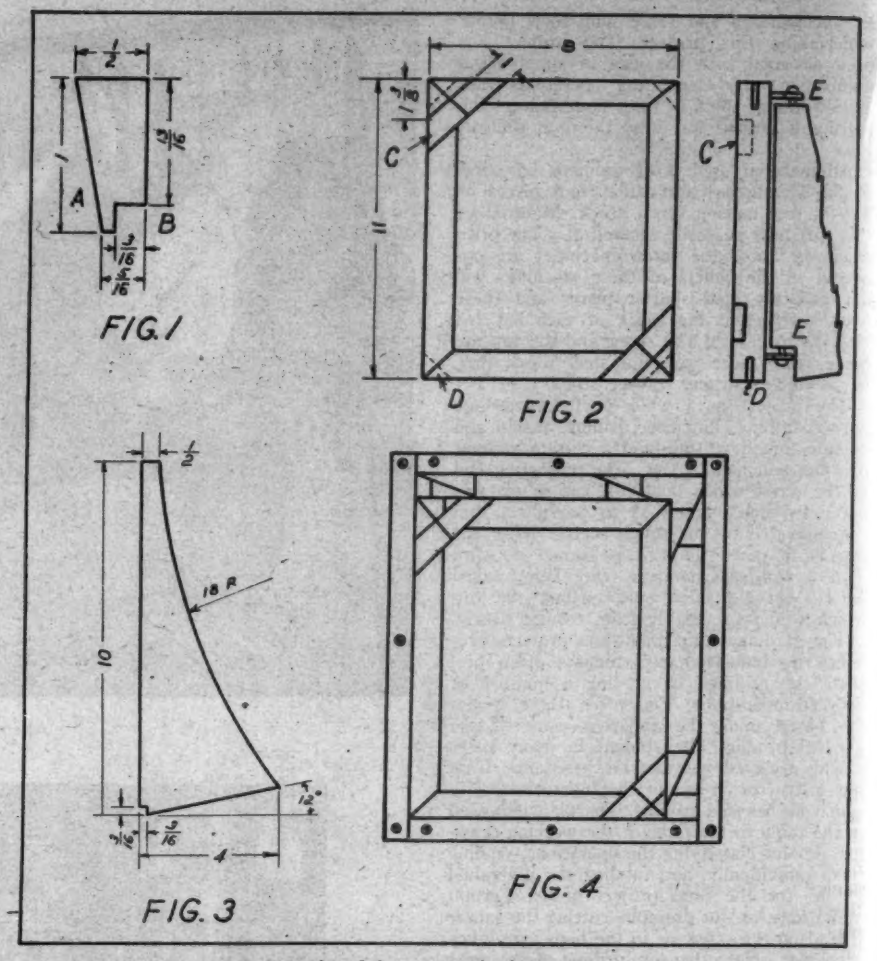
A rack was built with sufficient hooks to accommodate all the aprons and each hook was legibly stenciled with the same sequence of numbers marked on the aprons.

The system functions as follows. Each pupil upon entering removes his apron from the hook and puts it on. This immediately provides him with a shop apron, an identifying number, and a record of attendance. When the late bell rings the timekeeper simply checks the apron numbers still on the rack against the seating plan. This gives him a record of the absentees.

At the cleanup signal, the aprons are rehung. It is checked by the timekeeper before the class is dismissed.

If during the period a pupil desires to leave the room, his apron is hung on the hook from which he removes the room pass. This provides an easy method of identifying the person out of the room. On returning, the pass is again exchanged for the apron. Since we have two shops in our school, we have tried having the aprons accessible to pupils upon entering in one shop while in the other, the aprons are kept in the tool crib to be distributed by the tool crib man. We found relatively little difference between the two systems.

Both have been used the past two years to our complete satisfaction.



Details of frame and gluing jig

PICTURE-FRAME

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State Teachers College
Buffalo, N. Y.

Industrial-arts projects which include mitering and inlay are an exception rather than the rule. The picture frame shown includes both of these operations.

The inlay is simple and within the range of the student's skill. It is artistic as well as modernistic. This project, when completed, gives the student a sense of pride, and it will enhance that soldier brother's treasured picture.

A frame made of maple with a walnut inlay was found to be the best suited for the project. These two woods have good contrasting colors and take a fine finish.

The size of the frame will vary with the size of the picture used. This frame was designed for a 4 by 6-in. picture, and it is 8 by 11 in. overall. The main parts are made of ½ by 1⅛-in. maple. A collapsible support is provided to make the frame stand on a flat surface.

Fig. 5. The finished picture frame

Operations:

1. Cut out 1 piece of ½ by 1⅛ by 40-in. maple.
2. Cut a groove 3/16 by 3/16 in. in one lengthwise edge as shown at *B* in Figure 1. This space is for the glass, mat, and backing.
3. Plane smooth and bevel the face 3/16 in., as shown at *A* in Figure 1.
4. Sand the face and sides.
5. Miter one end; be sure that the bevel faces toward the inside groove.
6. On the long side of the strip, make a mark 11 in. from the mitered end and cut the second miter.
7. Recut a miter on the remaining piece and use the 11-in. piece as a template for the next cut.
8. Proceed in the same way, and saw out two pieces 8 in. long.
9. Test miters to see if they fit and form a 90-deg. angle.
10. Clamp a side and a top piece together. Place a code number on each piece at the mitered joint.
11. With a bevel square and a knife, cut 2 sharp 45-deg. lines 1 in. apart. See *C* in Figure 2.
12. With a back saw, make 2 cuts 5/16 in. deep. The measurement for this cut is made on the outside edge of the frame.
13. Clamp the remaining side and bottom piece together, and proceed as in steps 11 and 12.
14. Remove the stock between the two saw cuts with a paring chisel.
15. Cut 2 pieces of walnut 5/16 by 1 1/16 by 4¼ in. full. Plane the width to fit snugly into the 1-in. groove of the frame.
16. Clamp the two other mitered corners

together and with a back saw, make a cut ⅝ in. deep. See *D* in Figure 2.

17. Proceed in the same manner with the remaining two pieces.

18. Make 2 maple corner wedges 1/16 by ¾ by 1¼ in.

19. Assemble the frame and walnut inlay; fit and place code numbers on the parts.

20. Take the frame apart; apply glue to all joints and clamp together in a picture frame clamp. Such a clamp may be made, as is shown in Figure 4, by fastening 4 strips of wood with an inside dimension of 11½ by 8½ in., to a large board. Use 2 tapered wedges at each top corner and 2 wedges at each side corner, as shown in Figure 4.

21. When the glue is thoroughly dry, remove the picture frame from the fixture and smooth the walnut flush with the maple frame.

22. Fine sand the completed frame and apply two or three coats of shellac or lacquer. Steel wool the last coat.

Collapsible frame support:

1. With a coping saw or band saw, cut a piece of ¼-in. maple or plywood, as shown in Figure 3.

2. Sand, shellac, or lacquer, and steel wool.

3. Screw 2 small screw eyes in the center of the top and bottom ½ in. in from the edge.

4. Fasten the support to the frame with No. 4 by ⅜-in. r.h.b. wood screws, as shown at *E* in Figure 2. This project will appeal not only to the student but to his family. It employs many operations and yet consumes very little material.

HORIZONTAL LAP UNITS FOR GEM CUTTING

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Washington, D. C.

Cabochons, faceted stones, book ends, spheres, paper weights, crosses, cabinet specimens, and many other things can be made upon a horizontal lap unit.

Horizontal lap units are easy to make and may be made either single or double. A third horsepower ball-bearing motor that can be operated vertically will furnish power sufficient for either. Lap kits consisting of the lap, shaft, bearings and pan, may be purchased from dealers in lapidary supplies.

The vertical shaft of the lap unit may be either ¾ or 1-in. diameter cold rolled shafting. The one shown in Figure 1 is for a ¾-in. diameter shaft. In making the shaft thread one to fit a ¾-in. N.C. machine nut. This must be done on a screw cutting lathe to insure a true running lap plate. Square the other end.

The lap plate may be cast and then machined, or it may be made from a piece of boiler plate or other suitable material that has a thickness of at least ⅜ in. If a plate is used weld or rivet a nut to the center.

The best lap plate is one that tapers slightly from the center to the circumference. The tapered lap eliminates grabbing to a certain extent, and also enables one to flat lap a larger specimen as the material can overhang the center of the plate. See lap plate shown to the right in Figure 1. The flat lap will, however, serve most purposes and is much easier to make.

The speed should be from 200 to 250 r.p.m. With a 12-in. pulley on the lap shaft or spindle this speed is obtained by using a 1½-in. pulley on the motor.

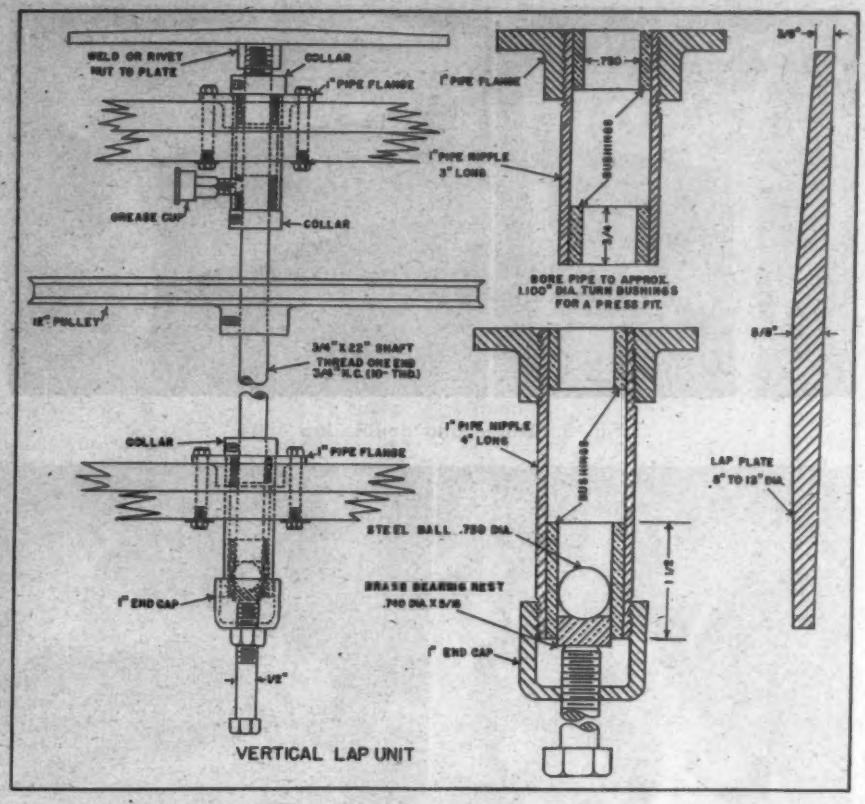


Fig. 1. The vertical shaft of the lap unit

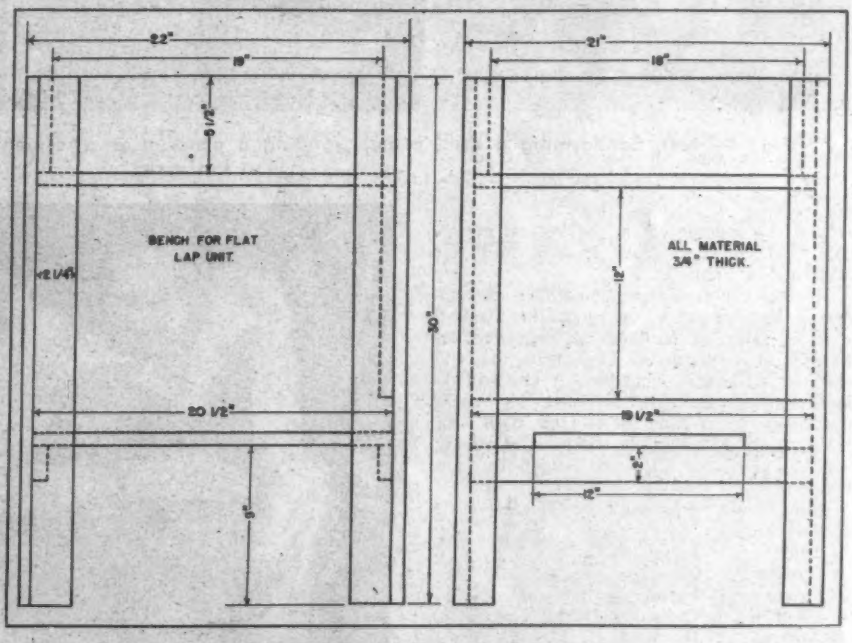


Fig. 2. The table for the lap unit

The top spindle bearing is made by screwing a 1-in. pipe nipple, 3 in. long, into a 1-in. pipe flange. Chuck this assemblage on a lathe and bore out the pipe to approximately 1.100 in. Turn brass or other suitable bearing material for each end, making a press fit, and drill and ream or bore to fit the shaft.

The bottom bearing is similar to the top bearing except that a longer pipe nipple and a longer bushing are used. A steel ball ¾ in. in diameter serves as a thrust bearing, the ball resting upon the end of a bolt through end cap, or upon a brass bearing rest held in place by the bolt through the end cap.

A pillow block bearing may be used for the top bearing and a lower bearing made by boring a ¾-in. hole partly through a maple block and dropping the steel ball into the hole.

Make a table for the unit and a removable metal tray of galvanized iron for the slush

Fig. 3. Single and double lap units

Unfortunately there are few places where industrial-arts teachers can learn the art of gem cutting. There are, however, scattered throughout our United States thousands of people in all walks of life who cut and polish gem stones as a hobby. Most of the amateur cutters, judging from the writer's experience, are more than glad to show a beginner some of the finer points.

Gem cutting has flourished in European countries for centuries with but very little change. Most of the colored cabochons (dyed chalcedony), known to the jewelry trade as "dyed onyx," have come to us from Europe. It was only within the past five years that one type of dyed stone, the black cabochon has been produced commerically in the United States. The European cabochons are (or were) cut on large sandstone wheels about 5 feet in diameter and from 15 to 20 inches

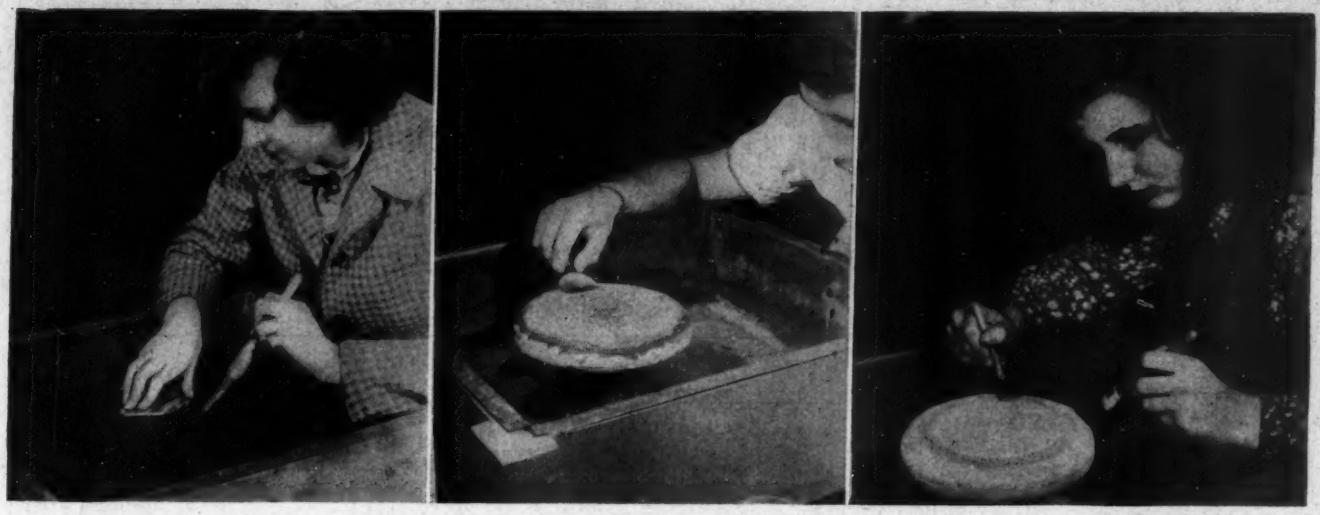


Fig. 4 — Left, flat lapping a slab; center, sanding a pendant on a resilient pad; right, polishing a cabochon on a lap stick

box. Solder a circular ring 1½ in. high around the opening cut in the bottom of the pan to keep slush from running into top bearing. See Figure 2.

Most of the gem material used in amateur gem cutting belongs to the quartz family, and is 7 or more in hardness as measured on Mohs' scale of hardness. This means that the material is harder than steel. A knife blade and window glass are of about the same hardness, 5½. A steel file is from 6 to 7 in hardness on Mohs' Scale. Glass is relatively soft as compared to agate, which is 7 in hardness.

Mohs' scale of hardness of minerals is as follows:

1. Talc
2. Gypsum
3. Calcite
4. Flourite
5. Apatite
6. Feldspar
7. Quartz
8. Topaz
9. Corundum (Ruby & Sapphire)
10. Diamond

Mohs' scale makes no comparison in hardness of the different materials. It merely signifies that a mineral belonging in one group will stratch all minerals belonging in a lower group.

The cutting of both cabochons and faceted stones, particularly the cabochons, is one of the newer types of craft work that has been introduced into many of our public schools throughout our country within recent years.

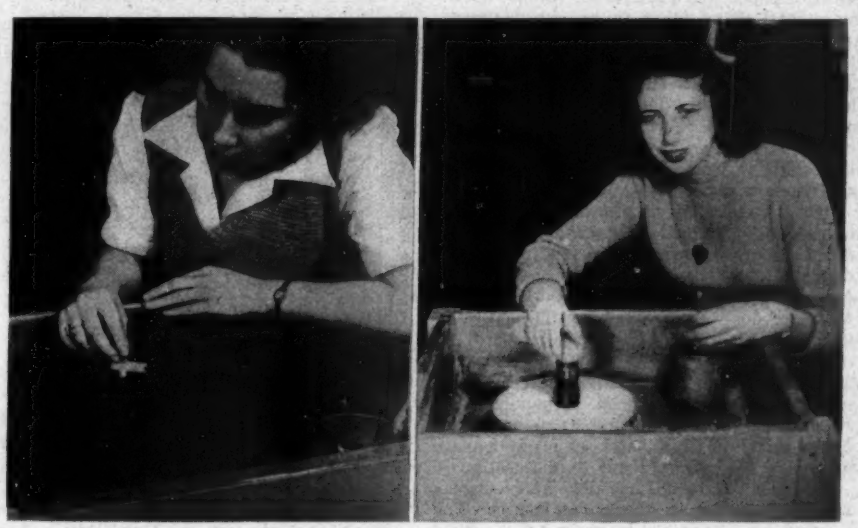


Fig. 5. Finishing a cross; right, capping a sphere

It is taught in connection with jewelry making in a number of schools and is as popular with girls as it is with boys. It affords students an opportunity to select the raw cutting material, study the markings, cut to shape and polish and then create their own design, thus carrying the project from beginning to end.

in thickness. They are powered by water wheels and make about 150 r.p.m. The operator lies face down, upon a specially built platform, braces his toes against cleats on the floor and exerts considerable pressure on the stone being ground as it is held against the revolving sandstone wheel. The stone was then polished by holding it against revolving

cylinders of wood, sometimes covered with canvas, using rouge or tripoli as a polishing agent.

The discovery of silicon carbide in 1891 and its subsequent adaptation to gem cutting has done much to foster gem cutting in the United States. Silicon carbide, the hardest abrasive that is made into vitrified grinding wheels, is a product of the electric furnace. It is surpassed in hardness by only one artificial abrasive, Boron carbide, which was developed in 1934 by Norton Company. Boron carbide is expensive and available in grit form only. The diamond is the only mineral that is harder than silicon carbide. Silicon carbide ranks in hardness between the corundum and the diamond. Silicon carbide is sold under such trade names as Carborundum and Crystolon.

Vitrified silicon carbide wheels are suitable for gem cutting. The bonding of the wheels varies as to the material being cut, the general rule being: The harder the material, the softer the bond. In general, the medium grade bond will suffice. There is no standard system used in the grading of vitrified grinding wheels, other than letters are used. Most wheel manufacturers use the system adopted by Norton Company, or that used by the Carborundum Company. The two systems are directly opposite. They are:

Norton Company

Very soft	*Soft*	*Medium*	*Hard*	*Very hard*
E,F,G	H,I,J,K	L,M,N,O	P,Q,R,S	T,U,W,Z

The Carborundum Company

Extra hard	*Hard*	*Medium*	*Medium soft*	*Soft*
E	F,G,H	I,J,K, L,M	N,O,P,R,S	T,U,V

There are four steps in the making of a cabochon: (1) slicing; (2) grinding; (3) sanding; and (4) polishing.

There are two methods of slicing the rough material, the silicon carbide method and the diamond method. Both in most instances use revolving saws. The use of diamond charged metal disks has generally superseded the old type of sawing using silicon carbide grit. The diamond saw method is quicker and saws a uniform slab. Diamond sawing has made great strides in helping our war effort in the sawing of the quartz wafers used in much of our war equipment. The diamond charged disk is relatively inexpensive, considering their usage. Several companies now sell a 12-in. diamond charged metal saw for less than nine dollars. Such a saw used properly, in the right equipment, will saw hundreds of square inches of gem material.

To one just starting gem cutting, the writer suggests that he buy the first gem material already sawed. Sawing is an art in itself, although easily learned, but the beginner is generally too eager to see the finished product to construct a saw suitable for handling the diamond impregnated blade. Dealers catering to hobbyists have sawed slabs.

There are two methods of grinding or shaping the cabochon. One method makes use of silicon carbide wheels of a medium bond, on ordinary heavy duty bench grinders, or specially constructed arbors, with a stream of water running on the wheel to keep the wheel clean and to keep heat down in the stone to avoid cracking. The other method makes use of the horizontal cast iron or steel lap. Silicon carbide grit, 80 or 100 grain size, is mixed with water and placed on the lap and used as an abrasive, or water is allowed to drop from a reservoir onto the lap and grit is applied to the wet lap. This method is somewhat slower than the wheel method but there are countless cutters who will use no other method. Silicon carbide wheels

Fig. 6 — Left, working on a double lap unit; right, lapping a cabinet specimen

mounted on steel plates that are threaded to fit the lap spindle can be used on lap units but they are at present unobtainable.

After the stone is roughly ground to shape, mount it with sealing wax to the end of a dop stick, which is a short length of dowel rod. The dop stick facilitates handling and enables one to get a smooth surface by constantly keeping the cabochon on the move. Grits finer than 100 are generally used, usually 220 or 320. Wash and scrape the lap plate when changing grits to avoid contamination of the finer grit. A metal slush pan for each grit size used is advisable. In the polishing of flat specimens use of the finer grits, 500 or 600, for the final lapping is necessary.

After cabochons are lapped with the No. 220 or No. 320 grit they may be further smoothed by *sanding* on a dry sander, or lapped in a grooved hardwood lap, using No. 320 grit. This will eliminate small pits. The dry sander is made by covering a wood disk with felt or sponge rubber and then covering with canvas, tacking the canvas on the back side. This disk is then mounted on a face plate that fits the lap spindle or other arbor. The sander is then charged by covering with hot cabinetmakers (animal or hide) glue and dusting on No. 220 or No. 320 silicon carbide grit. This type of sander can be recharged by washing in hot water, drying, and then recoating with glue and grit.

Use the sander dry. Avoid overheating or the gem stone will break. Keep the stone in constant motion as this tends to eliminate scratches. Many of the cabochons cut from material of quartz hardness (7) which include agates and jaspars, will take a fair polish on a well worn sander.

Polishing is done upon felt, muslin, canvas or leather buffs. If felt is used, a felt wheel may be used on a buffing wheel, or a felt disk may be cemented to a wood disk mounted to a face plate that fits the vertical shaft of the lap unit.

Levigated alumina is perhaps used more today by amateurs as a polishing agent than anything else, due to its availability and low cost. Mix the powder with water and apply with hand or brush to the polishing buff. Tin oxide is an excellent polishing agent, superior to levigated alumina, but due to war-time scarcity it is still practically unavailable. Powdered rouge can be used satisfactorily, as well as many of the optical polishing powders.

Before attempting to cut faceted stones one should master the art of cabochon cutting. Faceted stones are cut upon horizontal running lap plates. Two methods are used in cutting the facets. One is to use the jamb peg in obtaining the proper angle. The other method makes use of faceting devices which are indexed and are applicable only to round girdle stones.

Spheres can be cut on a lap unit by first sawing the material into a cube, cutting off all corners, and then rough grinding or lapping on the lap plate. A specially made tube is necessary for making the sphere. It consists of a pipe nipple, somewhat smaller than the sphere, screwed into an end cap that is threaded to fit the lap spindle. A cork or wood is fitted into the nipple to keep grit from going down into the spindle threads. Cut a hole in the center of a pie pan and after screwing a nut, or a nut cut in half, on the spindle place the pie pan on the spindle and then screw the end cap in place. The pie pan acts as a protector to the top bearing, throwing aside all spilled grit.

Wet the rough ground sphere, roll it in No. 80 or 100 grit and place in the revolving pipe nipple. Keep turning the sphere and do not worry about it being ground or lapped true. If it is constantly turned, when all pits are removed the sphere will be accurate. Then clean the pipe thoroughly and use No. 220 grit. Repeat with No. 320 grit and finally with No. 500 grit. Polish the sphere on a muslin buff using any of the polishing agents, or the pitch cup may be used. Prepare the pitch by melting 16 parts asphalt, 8 parts rosin, and 1 part beeswax. Pour into a metal cup (half of a tin can), and when nearly cool press the sphere which has been dipped into a soap solution into the pitch. Remove the sphere and with a knife point score the

Fig. 7. The author grinding a slab of Montana agate on a silicon-carbide wheel

(Continued from page 382)

locations are painted on the board and a bolt is already inserted at each location for quick change to a different length lamp. A 15-20 watt and a 30-40 watt starter are so located in their bases that a common push button as used on a doorbell circuit can be operated to light the lamp in case of starter failure. Knife blade switches are provided for convenient shift of current to the proper auxiliary part. A DPDT switch shifts current from the 15-20 watt to the 30-40 watt ballast and their respective starters. SPST switches are opened when a test ballast is connected and a SPDT switch directs current flow through the 30-40 end.

Line voltage is supplied to the board through a 18-2 rubber cord to switch and pilot units of the "Despard" line in a utility surface box. Portability of the entire unit could easily be increased by hinging the board near the middle of the length and adding a suitcase handle. This should be quite convenient in making service calls.

HOW TO TAKE NOTES

CAPT. FRANK D. DOLAN

Chief, Training Methods Branch, Ordnance School,

Aberdeen Proving Ground, Md.

This material was specially prepared for use in the ordnance school. While it is necessarily directed to the ordnance man, it may be applied equally well to students of other subjects.

You are an ordnance man sent here for the purpose of mastering certain ordnance information and certain ordnance skills. The success or failure of the course you are about to start can be measured largely by the extent to which your efficiency as an ordnance man has been increased in the time you spend here. The more information and knowledge you take with you into the field, the more efficient you and this army will be. Your efficiency will depend, however, not only on the amount which you learn but also upon the extent to which you have organized your knowledge for practical use under combat conditions. The purpose of this material is to offer some suggestions as to how to take notes so that the notebook you take with you into the field will help increase your day-to-day effectiveness as an ordnance soldier.

Whether or not your notes will be worth the paper they are written on will depend largely on the purposes you keep in mind while taking them. There are several good reasons for taking notes. Some of the best are as follows:

1. *Systematic Review.* You are going to learn a great deal in the next few weeks, and most of what you learn will be of a technical nature. Quite obviousiy you will not be able to remember it unless you make frequent and systematic reviews. A notebook makes this problem of review a relatively simple one by making it possible for your mind to travel again the same mental path it traveled before. At the same time it gives you a chance to decide very quickly what your weak spots are and where you need more work.

2. *Use in the Field.* One big advantage of a complete notebook lies in the fact that you can include in it information which might be scattered throughout four or five technical manuals. You must never make the mistake of thinking, however, that your notebook, no matter how complete, can ever take the place of technical manuals and other sources of information. Another important feature of a well-built notebook is that it makes frequent references to the exact page in the technical manual from which the information was taken and where more detailed knowledge can be obtained. One of the most valuable functions of a notebook is to enable you to become thoroughly familiar with the sources of information upon which you will have to depend in the field. Nevertheless, you might just as well be prepared for anything. As you build your notebook just keep in mind that it might sometime be your only source of information. Get into it all the things such a handbook should have.

3. *Exams.* You will probably want to take good notes so as to be able to pass the exams. Although this isn't one of the best reasons, it is entirely legitimate. Be careful, however, not to allow this to become your sole purpose. If it does, then you might just as well ask your instructor to provide a circular file in every exam room so that you will have some place to deposit your notes as you leave.

4. *An Aid to Learning.* The job of note taking is a process whereby a student absorbs the thoughts of the instructor and makes a record of them in his own words. Because it forces you to think, a notebook can be a very effective aid to systematic learning. In addition, it has been found that the very act of translating the thoughts of others into your own words will stimulate a flow of ideas. There is a "priming of the pump." Another advantage of well-built notes is that their logical arrangement makes an impression on the mind. In other words, you not only *hear* what the instructor has said but you can also *see* it. Such a visual impression is a valuable aid to learning.

Choice of Book

The choice of book will depend largely on the personal tastes of the student. It is well, however, to:

1. Use a looseleaf notebook with a hard cover — preferably one with three rings.

2. Choose one that is about 5½ by 8 in. or a little larger.

3. Don't, under any conditions, use a notebook that won't stand up under a lot of rough treatment.

What Notes Shall I Take?

For most men the problem of taking notes has two angles:

1. What notes shall I take?

2. How shall I take them?

The answer to the first question must be supplied by two people: yourself and the instructor. *You* are the best judge of just how much you know and how much there remains for you to learn. The instructor, on the other hand, has a good working knowledge of what the most important points in his subject are. You can count upon him to emphasize them. In determining what notes to take, keep the following points in mind:

1. *Reasons Why.* Remember the reasons why you are taking notes. These have already been listed in the foregoing.

2. *Key Terms.* Look for the words or terms around which the material you are learning revolves. You can expect the instructor to place heavy emphasis upon them.

3. *Blackboard.* If the instructor puts a term or sketch or formula on the blackboard it is usually because he wishes you to remember it. Write it down.

4. *Emphasis.* Listen for such terms as: "This is important . . . " "Remember . . . " "On the other hand . . . " "To sum up . . . " Expressions like these are usually followed by something worth noting.

5. *Mannerisms.* Some instructors have mannerisms of voice and gesture which indicate when they expect you to take notes. Look for them.

6. *Look Around.* Keep an eye on other men in your class whose judgment you respect. Usually they can be counted on as good guides to what is worth noting and what isn't. You will have to be careful. Some men don't take very many notes if they already have a thorough grasp of what is being covered. Use your head.

7. *Wrinkles.* There are tricks to every trade. During the next few weeks you will have plenty of chances to pick up little short cuts or emergency measures which you probably won't find in the technical manuals, but which will save you much time and effort in the field. You can learn these wrinkles from other men in the class or you can pick them up from such publications as *"The Ordnance Sergeant"* and *"Army Motors."* These two magazines make it a policy to publish such items regularly. So do some of the trade journals put out by firms like General Motors and Allis-Chalmers. Clip and insert them in your notebook.

8. *Take it Easy.* Don't knock yourself out trying to write down everything the instructor has to say. Most of his words are intended to help you to understand as you listen. Listen and learn. When you understand what he is trying to get across and can put his ideas into your own words then — and only then — start writing. If you are not careful in this regard you are likely to find that your notebook will rapidly assume the proportions of an encyclopedia and the appearance of a wastebasket.

How Shall I Take Notes?

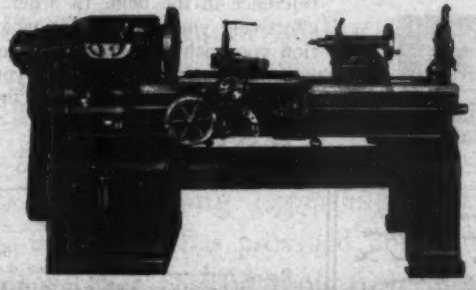
The answer to the second question, "How shall I take notes?" requires rather detailed treatment, because it is the aspect of note taking with which the average man has the most trouble. Here are some suggestions:

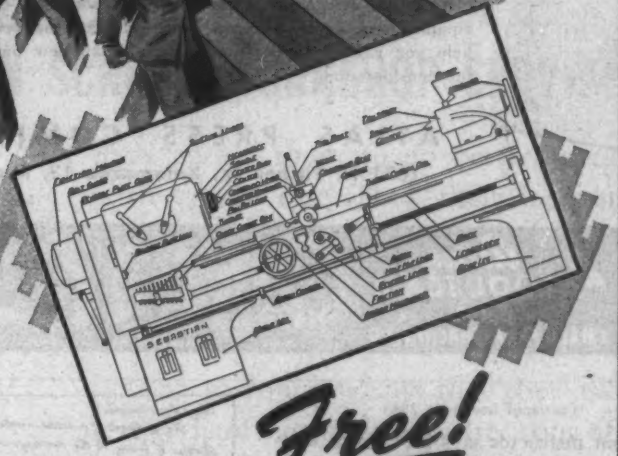
1. *Not Too Much.* Most men have a tendency to write too much. This is usually a result of their anxiety to get down everything that is important. Their error lies in the fact that they fail to realize that *everything* isn't important. Some of

(Continued on page 30A)

when G.I. JOE comes marching HOME!

When he hangs up the uniform and gets into his peace-time clothes—he's going back to school. But he's a different fellow from the pre-war student—and even the fellow who's been taking war industry training. He's going to demand high standards of training—highest quality in equipment. Are you ready for him? Is your equipment modern—so he can be prepared for jobs in highly specialized industrial plants? Include Sebastian Lathes in your modernization and replacement program so you can give him precision training on the lathe he'll likely use when he goes into the shop.





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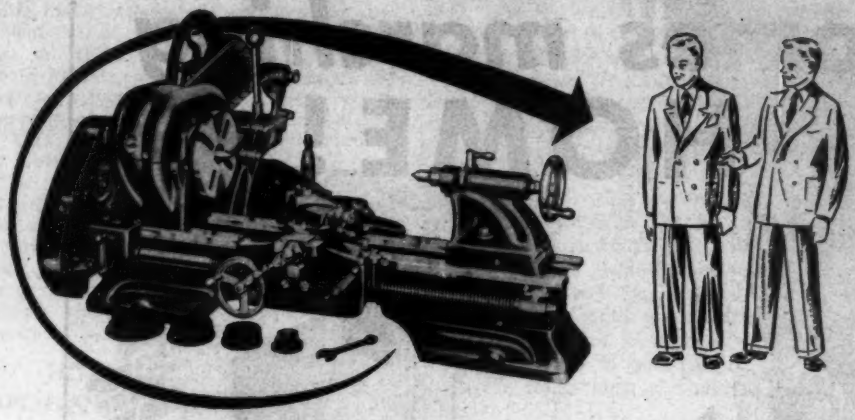

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like. Your job is to get into your notes your own accurate outline of the material covered. In the illustration shown below are two samples of notes taken in the same class:

Questions:

1. If you were asked to pick out of the notes the three phases of a recoil system, which of the sample pages presents the quickest and surest place of reference?
2. Which page indicates the more systematic grasp of the subject?
3. Underline the words in the sample pages which might have been omitted.
4. Do the key words in this sample stand out? Is there room for additional information? Is the page indexed or dated?

Comments:

1. Key terms have been underlined.
2. Page has been dated and indexed in upper right-hand corner.
3. Plenty of room has been left for the insertion of additional comments, sketches, references, etc.
4. Very few unnecessary words — yet the meaning is clear.
5. It is a simple matter to find your way around in these notes.

3. *Margins.* Don't crowd the page. Your note taking isn't finished when your class ends. In reading the references you are sure to come across additional information which you will wish to insert in your notes. Frequently, too, you will wish to revise something which you have taken down. For these reasons it is advisable to leave generous margins at the top and left and about one inch at the right and bottom. A little experience will tell you how much space to leave. Don't hesitate to use these margins for such things as references, simple sketches, question marks, and other signs which will indicate that something is important or puzzling or obscure.

4. *Check List.* We have said that one of your objectives should be to build your notes into a handbook for use as a ready reference in the field. In order to do this effectively you must decide what information you wish to include in order to make your notebook as complete as you desire it. Here is a list which you might find helpful:

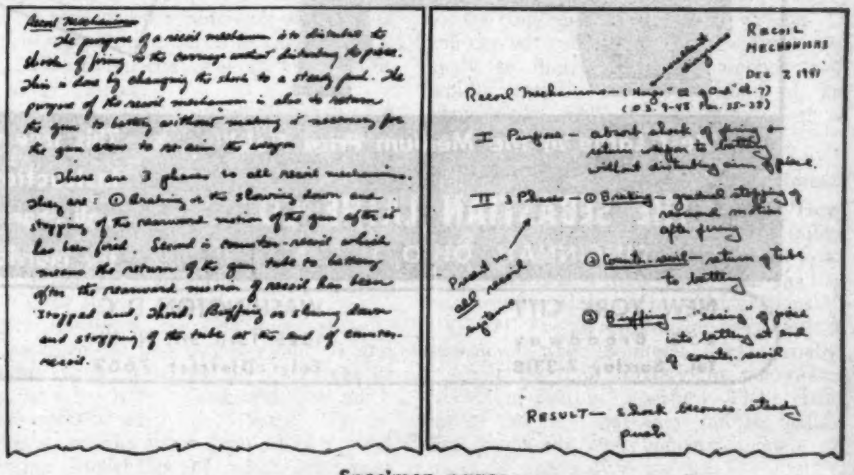
a) Correct nomenclature.
b) SNL group.

(Continued on page 32A)

(Continued from page 28A)

what your instructor says isn't worth writing down, either because it is relatively unimportant or because it is very easily remembered. Give your memory and your common sense a chance.

2. *Outline.* Running through every subject is a skeleton of facts and information around which the rest of the material is built. All the rest is window dressing. The notes of your instructor represent his conception of what this skeleton is like, and the phrases and sentences he throws in your direction are the flesh and blood which he hopes will enable you to get a clear picture of what the whole thing looks


Recoil Mechanisms
The purpose of a recoil mechanism is to distribute the shock of firing to the carriage without disturbing the piece. This is done by changing the shock to a steady push. The purpose of the recoil mechanism is also to return the gun to battery without making it necessary for the gun crew to re-aim the weapon
There are 3 phases to all recoil mechanisms. They are: ① Braking or the slowing down and stopping of the rearward motion of the gun after it has been fired. Second is counter-recoil which means the return of the gun tube to battery after the rearward motion of recoil has been stopped and, Third, Buffing or slowing down and stopping of the tube at the end of counter-recoil.
RECOIL MECHANISMS
Recoil mechanisms
I Purpose
II 3 Phases
① Braking
② Counter-recoil
③ Buffing
Result

Specimen pages

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FORWARD STROKE:
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RETURN STROKE:
No pressure is applied
on Return Stroke!
File teeth are intended to cut on the forward stroke only. For this reason no pressure should be applied during the return stroke. The file should be raised clear of the work. Failure to observe this precaution will dull the file and often destroy its usefulness.
However, there are two exceptions to this rule. In draw-filing, pressure is applied both on the forward and on the return strokes. This is done because, in order to get a shearing cut, the file is held at right angles to the direction of motion. In this position, the file is cutting at an angle without subjecting the teeth to destructive wear.
In filing soft metals such as lead, aluminum or brass, the file may be dragged lightly over the surface on the return stroke in order to free the teeth of chips. In this way clogging is prevented.
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Good Tools since 1856
Awarded to the Newcomerstown, Ohio, Plant.
HELLER NUCUT FILES
WAVY TEETH

(Continued from page 30A)

c) References — with page and paragraph wherever necessary.
d) Tolerances, dimensions, etc.
e) Procedures of assembly and disassembly.
f) Safety precautions.
g) Methods of quick identification of equipment.
h) Points to look for in inspection.
i) Materials and possible field substitutes.
j) Time element involved in repair, replacement, etc.
k) Special tools and possible field substitutes.
l) Mathematical formulas.
m) Colors — where significant.
n) Probable malfunctions, causes, and corrections.
o) Numbers of Ordnance and QM forms.
p) Name and address of person or organization which will serve as a quick source of future information.

5. *Don'ts.*

a) Don't use unauthorized abbreviations which may be confusing. The letters "bl," for instance, can stand for either "blue" or "black." If there is an authorized abbreviation, use it.

b) Don't forget to number the pages of each lecture. Be careful always to start each lecture on a new page.

c) Don't make your phrases and sentences so brief that their meaning is obscure. You'll be surprised how strange your notes can look after a few months.

d) Don't hesitate to write directly on any mimeographed material which may be given to you. Frequently, a short phrase written directly on the mimeographed page can do more to explain a diagram than a whole sentence buried in your notes.

e) Don't get excited if you miss something you think is important. Leave a few blank lines and get it later. On the other hand, don't hesitate to ask the instructor to repeat something you don't understand. In most cases he will be only too glad to help.

f) Don't forget to underline key words and phrases both in your notes and in your mimeographed material. A red pencil used for this purpose will enable you to make very quick reviews at a moment's notice.

g) Don't fail to keep your notes well catalogued. You can do this in several ways. You can keep a table of contents in the front of your book. You can use index tabs or separator cards. You can put a brief note in the upper right-hand corner of the page to indicate what material is covered in the notes. For example, the notation "155H" in the upper right-hand corner would indicate that the page is devoted to notes on the 155mm. howitzer.

6. *Rework Them.* Go over your notes before they get cold. It happens frequently that a word or phrase which made sense when you wrote it will be entirely without meaning a few days or a few weeks later. Remember the story of the poet Browning, who was asked to explain a line he had written some time before. He looked at it for a minute and replied: "When that line was written only God and Browning knew what is meant. Now only God knows."

Drawings

You and Michelangelo. A man seldom forgets a picture he has drawn himself. This is one reason why your notebook will be invaluable to you, both as an aid to learning and as a means of quick identification of equipment in the field. It isn't necessary for you to obtain photographic exactness in your drawings; nevertheless you should make a real effort to keep in mind that an inaccurate drawing is not only useless but may even be dangerous. Here are some suggestions from men who have had considerable field experience:

1. *Identify.* Indentify the drawing carefully. There can be a surprising difference between two models of the same weapon. If your drawing was copied from a technical manual or an SNL be sure to indicate exactly the page and volume. There may come a time when you will want to check or improve your sketch.

2. *Blackboard.* A blackboard drawing is a simplified explanation of something which the instructor thinks important enough to emphasize by giving you a picture of it. The same thing goes for

(Continued on page 34A)

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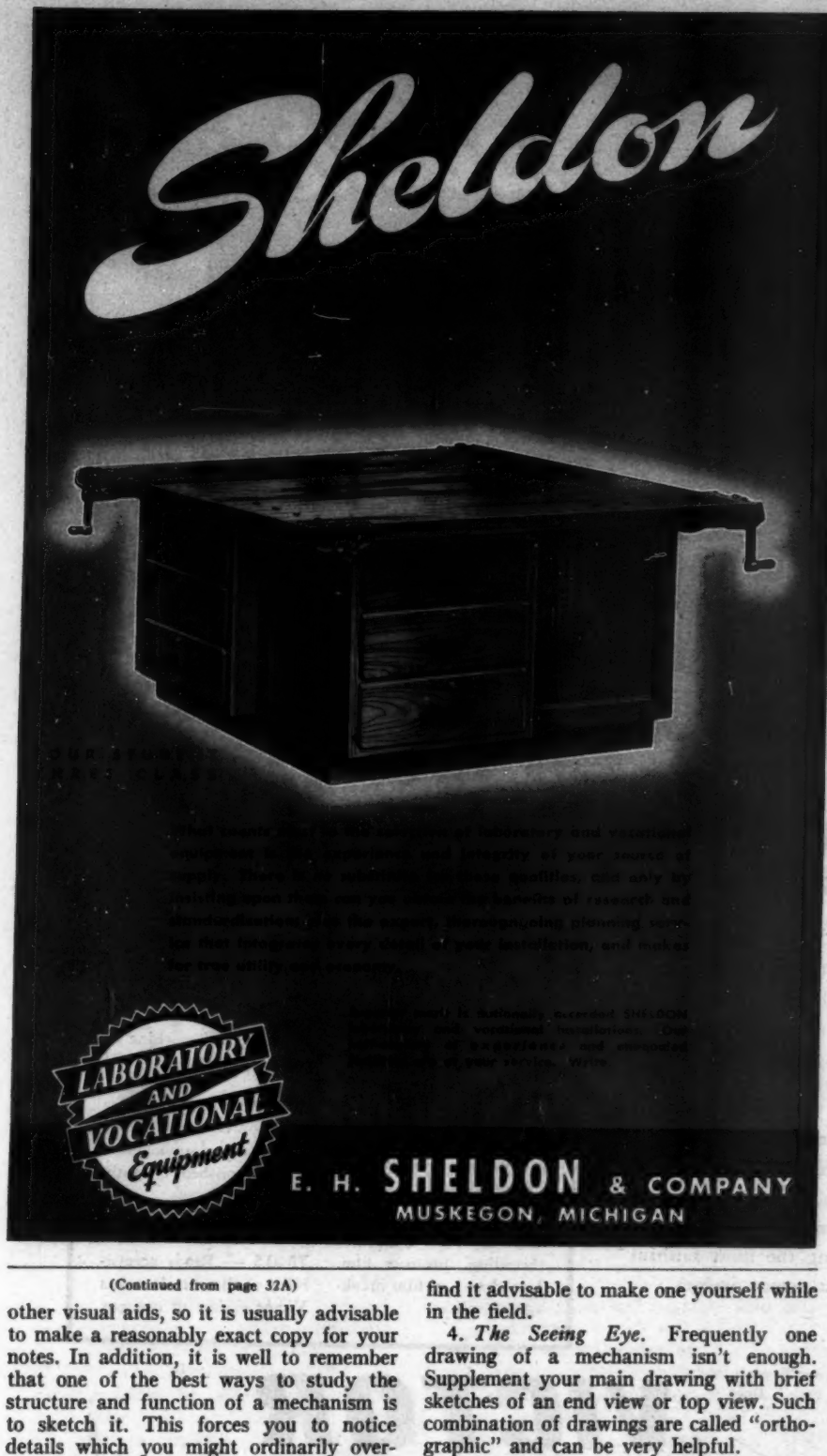

(Continued from page 32A)

other visual aids, so it is usually advisable to make a reasonably exact copy for your notes. In addition, it is well to remember that one of the best ways to study the structure and function of a mechanism is to sketch it. This forces you to notice details which you might ordinarily overlook.

3. *Don't Crowd.* Leave yourself plenty of room for labels, dimensions, tolerances, and any additional information you may want to *insert later.* If any special tools are used it might also be a good idea to indicate what they look like. You might find it advisable to make one yourself while in the field.

4. *The Seeing Eye.* Frequently one drawing of a mechanism isn't enough. Supplement your main drawing with brief sketches of an end view or top view. Such combination of drawings are called "orthographic" and can be very helpful.

5. *Exaggerate.* Do not hesitate to make distorted or "schematic" drawings for the purpose of simplifying or emphasizing something important. Frequently the most important part of a weapon or engine is very small. You may wish to make it appear a good deal larger in your sketch. Go ahead and do it so long as there is no danger of confusing the real thing.

6. *Pen vs. Pencil.* You will have to decide whether to use pencil or pen in making your drawings. Probably, under shop conditions, a pencil will be more practical. If you decide that it is, then be sure to choose a relatively hard pencil so that your drawings will not become smudged. If you wish to use a pen, use one with a fine point and one which does not leak.

7. *Locate It.* Be sure to orient your drawing in relation to the other parts of the vehicle or weapon to which it belongs. A sketch of a recoil mechanism, for instance, is liable to be momentarily confusing unless you indicate the direction in which the tube of the weapon is pointing.

8. *Keep Your Drawings and Your Notebook Clean.*

Personal News

DR. CHARLES A. PROSSER RESIGNS

Dr. Charles Allen Prosser, the dean of vocational education in America, resigned as director of The William Hood Dunwoody Industrial Institute on May 15, 1945.

Dr. Prosser was born at New Albany, Ind., on Sept. 20, 1871. He received his elementary education in the New Albany public schools, and was graduated from De Pauw University with a B.A. degree in 1897. He received an LL.B. from the University of Louisville in 1898, after which he was admitted to the bar. He received his M.A. degree from DePauw in 1906, and Ph.D. degree from Columbia University in 1915.

Honorary degrees were conferred on him by Hanover College, Alfred University, DePauw, and The Stout Institute.

Dr. Charles A. Prosser

Dr. Prosser served for 12 years as instructor, principal, and superintendent in the New Albany public schools. From 1909 to 1915 he was successively superintendent of schools of the New York Children's Aid Society, assistant commissioner of education for Massachusetts, and secretary of the National Society for the Promotion of Industrial Education.

In 1915 he was made director of the William Hood Dunwoody Industrial Institute. In 1917 he was granted leave of absence to become the first director of the federal board for vocational education. He returned to Dunwoody in 1919 and has since been granted leaves of absence to direct and supervise many surveys in this and other countries.

He has been professor of vocational education at the University of Minnesota, and has taught at summer schools at Cornell University, the University of Indiana, the University of California, Kansas State Teachers College, Harvard University, and Colorado Agricultural College. Besides this he has lectured at colleges and universities too numerous to mention.

He has also contributed extensively to the literature of his field and packed his fifty years of active service as an educator with such indefatigable labor that it is to be hoped that the remainder of his life may serve as a slight recompense for what he has so generously contributed to the field of vocational education.

THE NEW DIRECTOR OF DUNWOODY INSTITUTE

Joseph R. Kingman, Jr., treasurer of Dunwoody Institute, has been elected to succeed Dr. Prosser as director of that school.

He is a graduate of Amherst College, is the president of the board of directors of the Minneapolis Athenaeum, and a member of the board of Pillsbury Settlement House. He also is active in Boy Scout work.

Joseph R. Kingman, Jr.

Since coming to Dunwoody in 1938, he has been instrumental in the establishment of the Dunwoody Alumni Fund and has been an active member of its board of managers.

HUGH P. HARSHBARGER RESIGNS

Hugh P. Harshbarger handed his resignation to the Maine Township High School Board of Education, Des Plaines, Ill., last week after serving sixteen years as teacher and director of industrial arts at that school.

Mr. Harshbarger has been appointed general manager of Riley Feed Service in Des Plaines, Ill., and will take full charge of the firm's administrative program — sales and service, organizing new routes, publicity and general promotion.

Mr. Harshbarger has had many years of administrative and promotional experience. For the past four years he has had full administrative charge of the war production training program at Douglas Aircraft, with a faculty from fifty to eighty, and at the same time supervising the local ESMT war class program for Northwestern University and the University of Illinois.

As an instructor in advertising and mechanical drawing at Maine, he was also chairman of the industrial-arts department for the past ten years. He served on many state executive committees and in 1940 was president of the Illinois Industrial Association. In 1945 he was named chairman of the nine-man executive board of the Chicago Vocational Round Table which numbers more than 500 members.

Mr. Harshbarger is author of two widely used textbooks, "Planning," and "Practical Signs and Poster Work," both copyrighted in 1939. Many of his articles have appeared in national industrial publications.

He did his undergraduate work at Bradley Institute, Peoria, and holds a Master's Degree in Education from Northwestern University. He has been active in Kiwanis International, having served as president of the Des Plaines club in 1944. He was born and reared at Atwood, Ill., and started his teaching and coaching career at Fort Dodge high school, Iowa, in 1926.

ARTHUR D. BAILEY DEAD

Arthur D. Bailey, former instructor in mathematics at the Vocational School, St. Paul, Minn., passed away on January 1, 1945, after an illness of more than a year.

Mr. Bailey was born in 1884 at Westfield, Mass., where he was graduated from high school and entered industry serving an apprenticeship as a patternmaker. In 1909 he came to St. Paul and worked in several of the pattern shops in the Twin Cities. He then went to Glencoe, Minn., and later to Bemidji. In both of these places he taught manual training.

After serving in World War I, he returned to St. Paul and entered the school system as a mechanical drawing teacher at Mechanics Arts High School. The next fall he was transferred to the old Madison school to teach patternmaking and mathematics at the Vocational School, which was then housed in that building. From the time that the Vocational School started on the program for the rehabilitation of veterans, Mr. Bailey devoted his entire time to the teaching of mathematics, continuing in that capacity until his last illness.

Mr. Bailey was a graduate of the University of Minnesota, having completed much of his work in extension classes. He was a member of the Manual Arts Club, the Teachers' Federation, and the East Side American Legion Post. — *W. W. Pennell.*

APPOINTED DIRECTOR OF TRADE TRAINING

Dr. Joseph W. Fleming was elected director of trade training and practical arts in the Pittsburgh Public Schools April 1, 1945, to succeed F. W. Boland, retired.

Dr. Fleming is well prepared to take over these duties because of his training and wide experience.

(Continued on next page)

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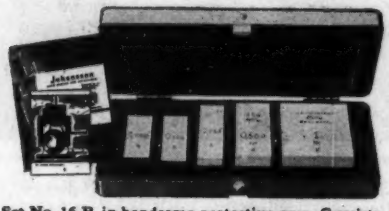

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GAGE BLOCKS

(Continued from previous page)

His teaching and administrative experience is that of shop instructor, vocational counselor, principal, senior supervisor, and now director. His practical experience was in the field of patternmaking and the related trades of foundry, machine and drafting as an apprentice, journeyman, and foreman. He was graduated from Carnegie Institute of Technology in mechanical engineering and earned his master and doctor degrees at the University of Pittsburgh. He has taught teacher-training courses at Yale, and Penn State, and is now on the vocational teacher training staff at the University of Pittsburgh on a part-time basis.

His experience as principal of the Allegheny Vocational School after the last world war in rehabilitating disabled war veterans should prove of value in the training of the returning veterans from World War II.

♦ MAX A. SCHENK, instructor in watchmaking at the St. Paul Vocational School, St. Paul, Minn., for the past twenty years, retired at the end of school year 1944-45.

He developed an efficient course of instruction in trade preparatory training in watchmaking which was accredited by the United Horological Association of America.

In addition to his regular day schoolwork, he has conducted many evening school courses in trade extension for employed watchmakers. During World War II he taught special classes in hand precision work for the repair and servicing of aircraft instruments.

♦ JAMES L. FIESER has resigned as vice-chairman at large of the American Red Cross to become assistant to the president of the National Safety Council.

Mr. Fieser assumed his new post September 1, with headquarters in the New York offices of the council. He will devote his time to the development and extension of the council's nationwide public service program.

As vice-chairman of the Red Cross for 23 years, Mr. Fieser achieved special distinction in building up and directing the organization's disaster relief service. In this capacity, and through his other duties, he became known to civic leaders and service organizations thoughout the United States and the world.

♦ Commissioner J. W. Studebaker recently named GLENN E. SMITH, State Supervisor of Occupational Information and Guidance Services, Jefferson City, Mo., to his Consulting Committee on Vocational Education. Smith is to serve as guidance consultant to the Commissioner's Committee as a representative of the National Association of Guidance Supervisors.

♦ H. F. RUSCH, supervisor of industrial arts and vocational education of the Oklahoma City Schools for the past 40 years, will retire September 27, having reached the retirement age of 68 years.

♦ EDGAR J. SPADY has been appointed to succeed the retiring H. F. Rusch, as supervisor of industrial arts and vocational education of Oklahoma City, Okla.

♦ W. H. WAGNER, formerly at the Central State Teachers College at Warrensburg, Mo., has transferred to the engineering department of North American Aviation Co. Inc., Kansas City, Kans.

♦ LOWELL WELSH, superintendent of schools at Nebraska City, has been appointed director of the State Trade School at Milford, Neb. Mr. Welsh holds an M.A. degree from the Colorado A. & M. College.

♦ DR. W. L. NICHOLAS has been appointed state supervisor of occupational information and guidance for Nebraska.

♦ OTTO W. GLOYER, 61, industrial-arts teacher at Dover St. School, Milwaukee, Wis., died Monday, June 4, 1945.

♦ PAUL HOWARD, formerly librarian of the Gary, Ind., Public Library, will represent the American Library Association and libraries at Washington. Mr. Howard expects to assume his new duties early in the fall.

♦ CHARLES ROWE of Merrill, Wis., has been appointed director of the Rhinelander School of Vocational and Adult Education. He succeeds Ralph J. Keen, who resigned to accept another position.

♦ FRANCIS G. CORNELL has been appointed chief of statistical research service, U. S. Office of Education.

♦ JAY R. JOHNSON, recently released from the army, has been appointed Iowa state supervisor of distributive education.

♦ WILDON OWENS, formerly day-school supervisor at the Kenosha, Wis., School of Adult and Vocational Education, has been appointed director of the vocational school at Ashland, Wis.

He was on the Kenosha faculty for 18 years.

Association News

♦ The Hudson County Industrial Arts Club had a get-together meeting at Edison School, Union City, N. J., Monday, April 30, 1945, at 4:00 p.m. Gus Ravotto, a past president, was host. This unit is one of State Industrial-Arts Director Robert A. Campbell's well-organized sectional groups that became a war casualty, but which is now resuming educational activity.

Many familiar faces were missing due to military assignments, urgent duties, or other factors, when President Daniel O'Keefe of Hoboken opened the meeting.

This being the election session, the following officers were elected:

President, G. Harold Billingham, Weehawken

Vice-president, Elwood K. McFarlin, West New York

Secretary, Joseph Reo, West New York

Treasurer, Walter G. Markel, Union City.

Mr. Billingham, the new president, is a member of the faculty of Weehawken High School, and the author of articles on foundry engineering, inspector training, organization, teaching aids, safety devices, auto mechanics, maintenance shorts, and projects in home, school, and trade magazines.

The members were informed of the untimely death of Harry Branton, an inspired industrial-arts instructor of Hoboken. Mr. Sol Gottlieb memorialized the deceased, and a group standing silent prayer was offered in his memory. The secretary was instructed to send an appropriate testimonial letter to his widow.

Plans were completed for a round-table discussion at a later date.

State Director R. A. Campbell then introduced Mr. Ernest DeWick of Rahway, N. J., high school, who has achieved outstanding success both in working with and teaching others the many uses and practical tooling of plastics.

His exhibit included vases, rings, jewel boxes, trays, key rings, charms, nut bowls, scalloped dishes, letter openers, and picture frames. These were a many colored, workmanlike, desirable assortment.

He urged shop teachers to add this important material to their programs.

♦ The Executive Committee of the Southern States Work Conference, a co-operative planning organization participated in by fourteen Southern states, has set up a 1945 study which bids fair to be most significant in the promotion of vocational education. The study had its origin in the recommendations of a 1944 study committee, headed by M. D. Mobley, now president of the American Vocational Association, and is enlisting the thorough co-operation of persons with primary interests in the field of vocational education as well as those with other interests.

The formulation of procedures for the study and the responsibility for guiding its development was completely delegated by the executive committee to a steering committee. The steering committee is composed of DR. L. D. Haskew, director of the Division of Teacher Education at Emory University, and Dr. John T. Wheeler, agricultural teacher trainer at the University of Georgia, as cochairman; Mr. M. D. Mobley, president of the American Vocational Association; Dr. O. C. Aderhold, on leave from the University of Georgia and director of the Georgia Education Panel; and Dean Kenneth R. Williams of the College of Education of the University of Georgia.

Differing markedly from previous procedures employed by the Southern States Work Conference, the study of vocational education is essen-

(Continued on page 39A)

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That's why so many educators in industrial and vocational schools now include COLOR DYNAMICS in their courses for the training of skilled shopmen. They recognize that this knowledge will be of great help to students in their future work.

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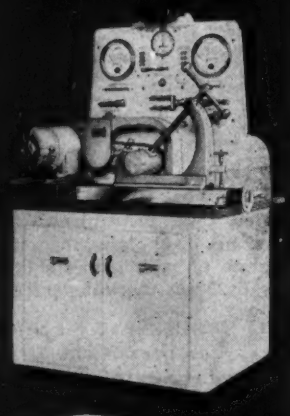

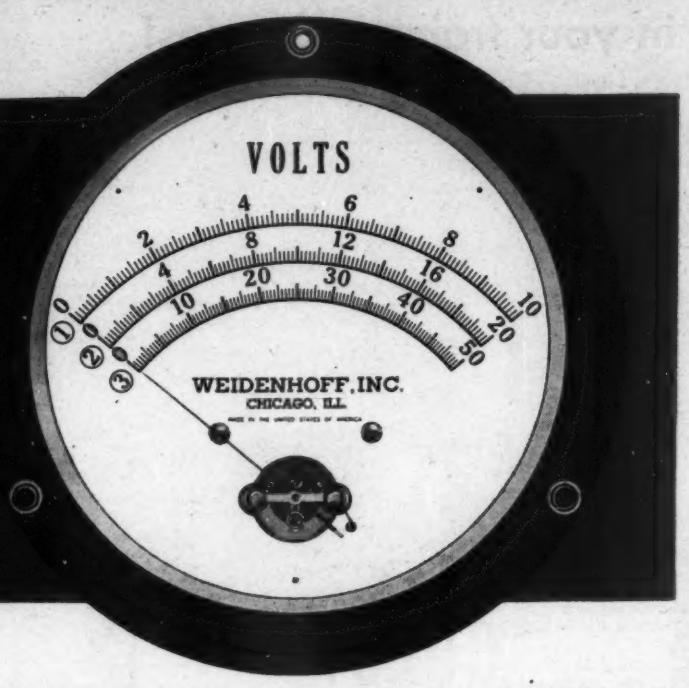

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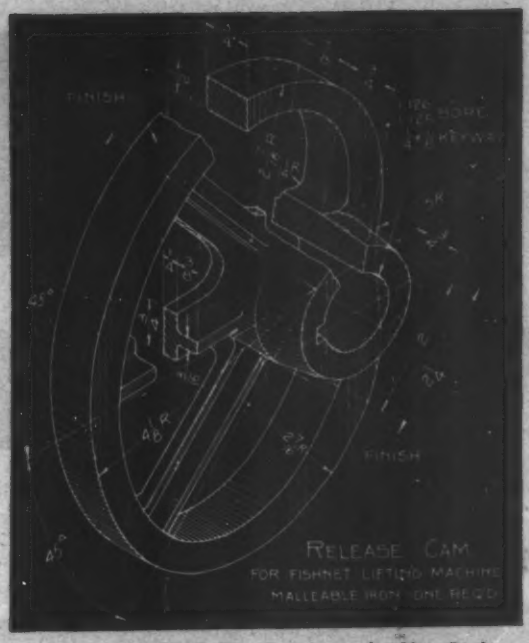

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(Continued from page 36A)

tially a state study. Each of the states has set up its own study committee, composed of equal numbers of people from vocational and total education, and each state is determining its approach and its problems. The steering committee is acting as consultant and stimulator of the state committees, and the study is expected to extend over a period of eighteen months or more, eventuating in state plans for vocational education which will be put into effect in each state.

Each state committee has reached the decision to employ the problem approach in its study. Looking first of all at the needs — and the steering committee has helped the states gather the data necessary to determine their needs — the committees propose to develop an educational program in line with these needs. Emphasis is being placed upon common planning of a total program of education, rather than upon the administrative elimination of certain sources of potential conflict, in the belief that the fundamental need is for all educators to see the entire picture and agree upon the directions in which all education should move.

Representatives of each of the state committees assembled at Daytona Beach for a two-week work conference during the summer, to present their plans to the assembled group.

According to the steering committee, the function of the present study is not to issue a pronouncement of what vocational education should be like, but to stimulate states to develop and carry through actual improvements within their own state. The potential conflicts which exist between the field of vocational education and the other fields of public education are not being ignored, but the conviction is strong that such conflicts can best be prevented by looking intelligently and with a common purpose at the total job to be accomplished by education and by working together in evolving ways and means to do that job.

♦ The Vocational Conference held on April 27, 1945, at the Maine Township High School, Des Plaines, Ill., was attended by school superintendents, principals, vocational teachers, and industrial executives.

H. P. Harshbarger acted as general chairman. The main speakers at the conference were John Buckwalter, plant manager of the Chicago plant of the Douglas Aircraft Co. Inc.; Carl H. King, supervisor, division of training at the Douglas Aircraft Co.; and Dr. J. C. Wright, Assistant U. S. Commissioner for Vocational Education, Washington, D. C.

The subjects discussed were "The Part Training Plays in Aircraft Manufacture"; "How Industry and School Cooperate"; and "Past, Present, and Future Trends in Vocational Training."

Discussion groups under the chairmanship of C. M. Henley, Oak Park; Walter Durbahn, Highland Park; Ray Lindenmeyer, Evanston; E. C. Pritchard, Chicago; C. J. Rogers, Des Plaines; Floyd Curl, Cicero; Milo Oakland, DeKalb; and Dr. J. C. Wright, Washington, D. C., followed the general session.

♦ By a majority vote of the members, the name of the state association for industrial teachers of Iowa was changed from the Iowa Industrial Arts Association to the Iowa Industrial Education Association, an all inclusive term to include both the industrial arts and vocational industrial phases of industrial education. The new name was adopted to permit an expanded association through participation of vocational industrial as well as industrial-arts teachers in Iowa. Greater state participation of all industrial education teachers will result.

The officers of the association are:
President, R. T. Henning, Davenport
Vice-president, Earl Kimball, Waterloo
Secretary-treasurer, Richard R. Kyl, Des Moines.

♦ The last meeting of the school year of the Trade Industrial Education Association (T.I.E.) was held in the Cathedral of Learning cafeteria of the University of Pittsburgh, Pittsburgh, Pa., on the evening of May 9, 1945. The meeting was in the nature of a get-together and a farewell to Fred W. Boland, retiring director of trade training and practical arts.

The speaker of the evening was Major Edward H. Gallup, Jr., of the Labor Relation Offices of the Pittsburgh Ordnance District, who gave an interesting account of the labor situation during the war. Dr. Gerald D. Whitney, associate superintendent, a former shop instructor, presented 36 teachers who had completed 25 years or more of teaching, with a beautiful flower.

During the farewell ceremonies, Mr. Boland was presented with a pen and pencil set, a wrist watch, an honorary membership in the T.I.E., and a remembrance containing signatures of those present. Among the many nice things said about Mr. Boland was the following biography written by one of the teachers and read by Dr. Whitney:

"Fred W. Boland, director of trade training of the Pittsburgh Public Schools, was born at Canonsburg, Washington County, Pa., and attended the academy there. He later received his Bachelor of Science degree from Carnegie Institute of Technology.

"One of the earliest positions he held was that of instructor of boys at the Western Pennsylvania Reform School at Morganza. While in this position Mr. Boland supervised the construction of a brick addition by the boys on the school grounds.

"Mr. Boland's first position with the Pittsburgh Board of Education was that of manual training teacher at the Franklin School. From this position he was transferred to Fifth Avenue High School, and later to the New Schenley High School. In these assignments he held the position of instructor of mechanical drawing.

"During the first world war Mr. Boland was assigned as supervisor of Red Cross work at Schenley High School and later made supervisor of Red Cross for all of the Pittsburgh Public Schools. During the years of the first world war Mr. Boland was appointed supervisor of ground aviation work at Camp Pitt and became supervisor of all industrial education in the Pittsburgh High Schools.

"At the close of the war Mr. Boland instituted the first school for rehabilitating the wounded soldiers. This work was begun on July 1, 1919, at the Schenley High School and moved in the fall of that year to the Allegheny Preparatory School buildings on the north side. Dr. Joseph Fleming, who has succeeded Mr. Boland as director of trade training, was appointed principal of the

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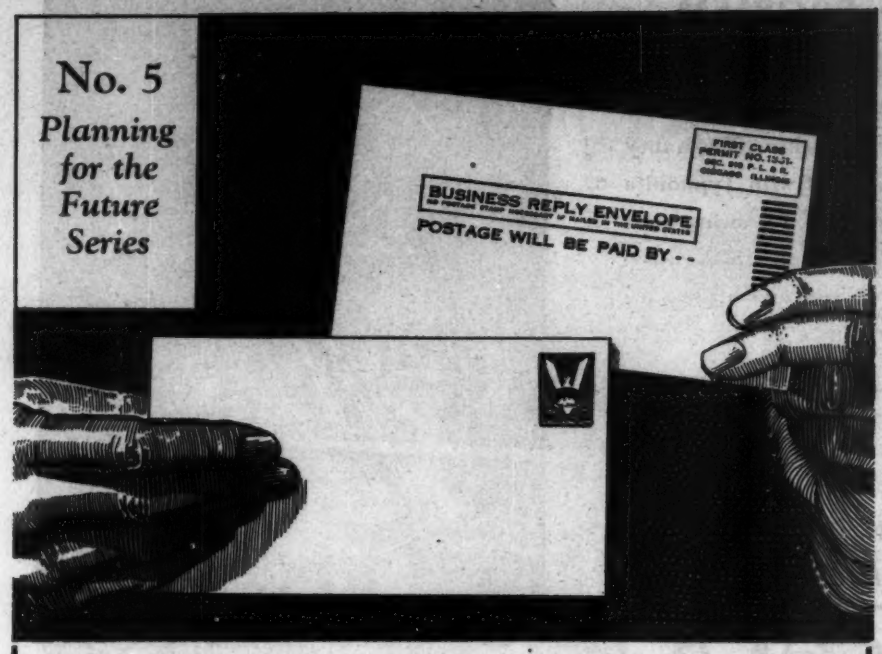

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(Continued from previous page)

Allegheny Preparatory School during the four years this rehabilitation work was conducted. Later the building, equipment, and personnel were taken over by the Pittsburgh Board of Education and the Allegheny Vocational School was developed.

"Mr. Boland acted for some time in the capacity of supervisor of industrial education in the high schools, and later as director of vocational and practical arts education. With his retirement vocational education and more especially the teachers he supervised, have lost a close and very dear friend. He will be missed greatly."

The newly elected officers of the T.I.E. for the 1945–46 school year are:

President, Wallace Master, Oliver High School, Pittsburgh

First vice-president, Rex L. Hammerly, Connelley Vocational High School, Pittsburgh

Second vice-president, John A. Linton, Turtle Creek High School, Turtle Creek

Treasurer, John A. Wragg, Peabody High School, Pittsburgh

Recording secretary, J. Earl Krotzer, South Vocational High School, Pittsburgh

Directors, T. Roy Allen, Veteran's Bureau, Pittsburgh; M. S. DuBarry, Washington Vocational High School, Pittsburgh; and Wilbur K. Monks, Clairton High School, Clairton. — *J. Earl Krotzer*, recording secretary.

Questions and Answers

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One other factor may prove to be the cause: your alcohol. Under no circumstances use motor alcohol as this is apt to be denatured with kerosene or other nondrying agent which will keep the applied coating sticky indefinitely. Use only the grade of denatured alcohol which is made for shellac. For the first coat use one part of well stirred shellac to five parts of alcohol; for the second and third, use one to three. These coatings must be brushed as little as possible and each coat must be dried hard in a warm room, regardless of the time needed. If the materials are correct, one hour should be sufficient.

If, after checking your remaining stock along the above lines, and you find that it is still nondrying, throw it away as the manufacturer cannot be expected to replace it after two years. — *Ralph G. Waring.*

News Notes

♦ More than 200 American technical experts drawn from almost as many different firms as well as from universities and government agencies are now in Europe investigating Germany's technical industrial war secrets under the direction of the Joint Chiefs of Staff and in conjunction with the Foreign Economic Administration and other government agencies. Among the new developments uncovered so far are the following:

A plane with a ceiling several thousand feet higher than any American plane.

Process for welding side seams on tin cans by machine instead of by hand, as in this country.

New applications of radiation devices in fields not heretofore explored in the U. S.

New and improved X-ray tubes for cancer therapy and industrial purposes.

Flexible high tension cables that withstand double the voltage of American made cables of the same size.

Tungsten substitutes for use in the manufacture of armor-piercing shells and cutting tools for machining metals.

Power circuit-breakers with construction details unfamiliar in the U. S.

New uses of waste cellulose materials for the manufacture of fats for animal food.

Improved techniques in the fermentation of yeast from wood sugar in the production of both human and cattle food.

Improved techniques for the production of synthetic petroleum products.

Hydrogenation plants operating at extremely high pressures.

New catalysts permitting the Germans to convert oil to high octane gasoline more quickly than was known here.

Details on German refinements in the gas synthesis method of producing liquid fuels and lubricants from coal.

New processing methods in the field of synthetic rubber.

New data on continuous polymerization processes in plastics manufacture.

New data on acetylene and electro-chemical processes.

Information on high temperature alloys unknown in the U. S.

Production of high-grade nitro-cellulose from lower grade wood pulp with stability superior to the same product made from high-grade pulp in the U. S.

♦ Postwar employment prospects in 11 occupa-

(Continued on page 42A)

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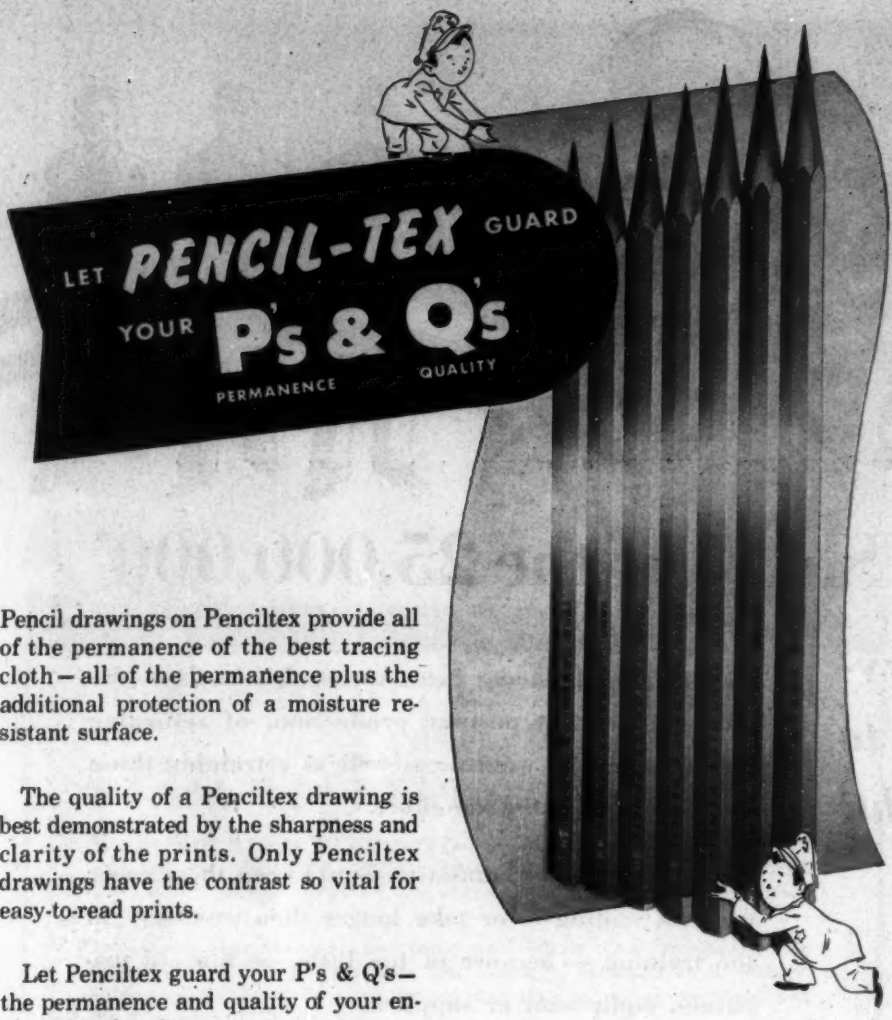

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NATION WIDE NETWORK OF POST DEALERS

(Continued from page 40A)

tions are described in 11 different six-page Occupational Abstracts just revised and published by Occupational Index, Inc., New York University, New York 3, N. Y.

The occupations covered are: banking, boilermaker, bookkeeping, city fireman, diesel engines, funeral director, insurance salesman, journalism, police officer, stenographic work, and veterinarian.

♦ Counselors, teachers, and others interested in giudance and personnel work will find an appraisal of postwar employment prospects, and related information, in a new six-page folder on *Guidance & Personnel Services* by Ruth Strang and Robert Hoppock, just published by Occupational Index, Inc., at New York University, New York 3, N. Y.

♦ Wisconsin now has a new law which permits school boards to contract with training schools approved by the civil aeronautics administration for flight training courses for high school pupils. The law was requested by the state department of public instruction, so that classes in the "science of aeronautics" could have a recommended four hours of flight instruction.

♦ Syracuse University has reserved an "Intra-Tel" system — wired television — from the General Electric Company for postwar delivery. The television equipment will be used to conduct various classroom teaching experiments, as well as teaching television programming and other techniques to students.

No decision has been reached at this time as to whether the University will broadcast programs to the Syracuse area, but as plans develop a co-operative arrangement may be worked out with local radio interests to accomplish this.

♦ The 25th annual observance of American Education Week will be celebrated November 11–17, 1945. Since its modest beginnings in 1921, American Education Week has come to be a great annual nationwide celebration of the ideals of free public education. It provides an opportunity to interpret to the people the meaning of education for free peoples.

The theme for the twenty-fifth observance is "Education to Promote the General Welfare." If our nation is to find its way to a prosperous and harmonious future, and if the world is to achieve a stable and enduring peace, the schools will have to play a major role in developing citizens who will work together for the common good.

For a complete list of the materials available to help plan a suitable program for the observance of this week, write to the National Education Association, 1201 Sixteenth St., N. W., Washington 6, D. C.

♦ Victory is ours but just as our boys did not get home on V-J Day, so our home front job is not finished either.

The treasury department is particularly anxious to have the schools continue to foster their savings program at least through the spring of 1946.

Two big objectives of the school savings program are:

(1) completion of a campaign to finance one or more $3,000 hospital units through school savings before Christmas vacation.

(2) Qualification by October 12 for the Treasury's School flag showing that at least 90 per cent of the students are saving regularly. A special "We Finished the Job" citation and insignia for school flags will be presented to schools which maintain their 90 per cent participation record during the winter and spring.

♦ The use of new types of building material in the postwar period will be studied by students at Colorado A. & M. College, Fort Collins, who enroll in a new course being offered for the first time this fall.

The course called, "Light Construction and Marketing," combines the study of engineering subjects, wood products, marketing, and business practices, in order to provide a solid background for employment in estimating and constructing on the new modern basis and also to market the conventional and new types of building material.

♦ Postwar employment prospects in three occupations — teacher, motion picture actor, and dressmaker — are described in three different six-page Occupational Abstracts just revised and published by Occupational Index, Inc., New York University, New York 3, N. Y.

Each abstract summarizes available information on the nature of the work, abilities and training required, earnings, number and distribution of workers, advantages, disadvantages, and postwar prospects.

♦ *Best Books of 1944 on Occupational Information and Guidance* by Robert Hoppock, Kathleen Pendergast, and Elizabeth Rosso, has just been released by Occupational Index, Inc., at New York Univeristy, New York 3, N. Y.

♦ The Providence, R. I. School Department has issued a 48-page illustrated booklet describing the educational opportunities in its schools for returning servicemen and women, for released civilian war workers, and all other adults desiring further educational or vocational training. The booklet, prepared under the direction of Superintendent James L. Hanley, provides a prospectus for what, it is hoped, will become an extensive program of adult education in vocational training, college preparation, and arts and crafts.

To carry out its proposed plan, the Providence School Department will utilize its present school facilities day and night. The program is provided under the sponsorship of Mayor Dennis J. Roberts and members of the Providence School Committee. The booklet lists credits, certificates, and the various kinds of diplomas which are the rewards of this study and explains the requirements for admission to courses.

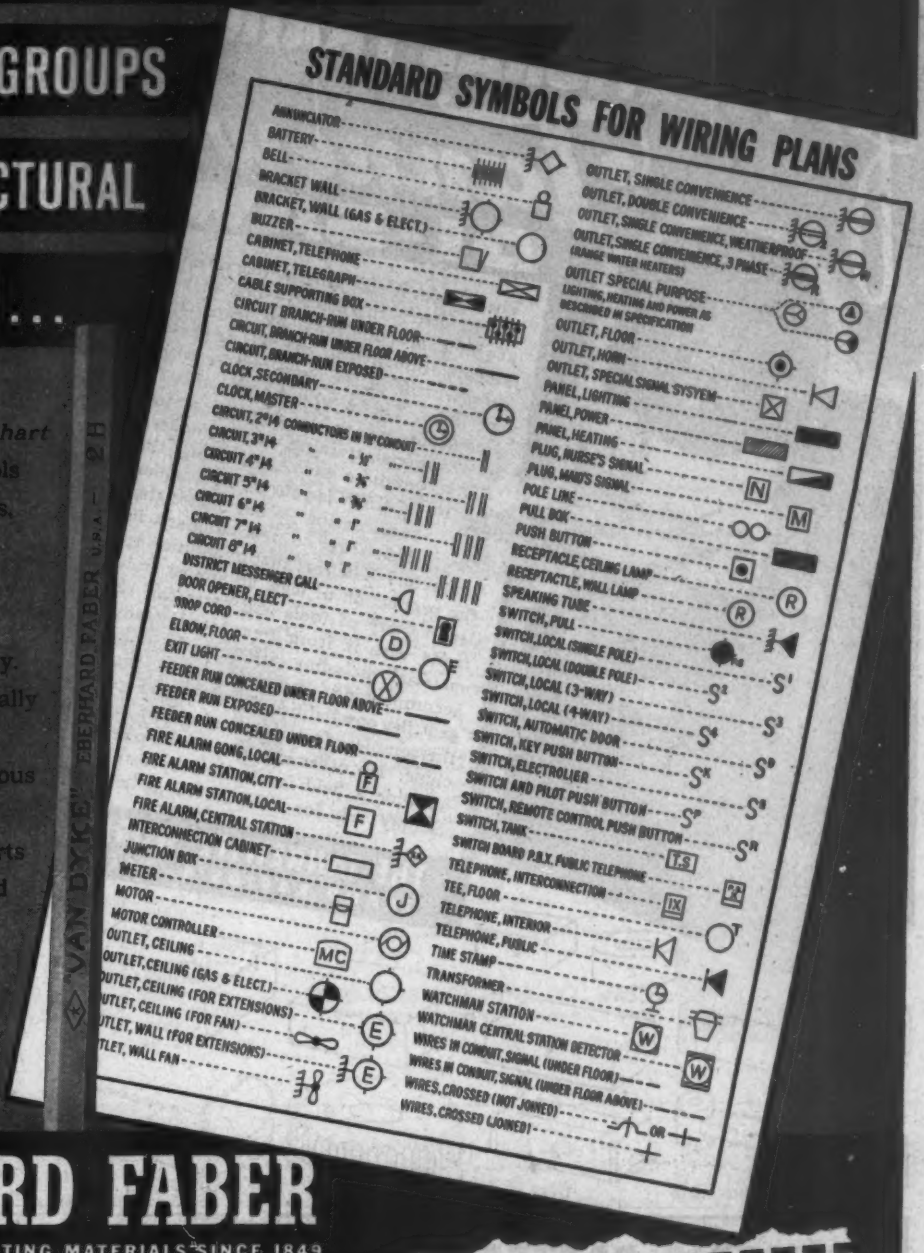
A unique feature of the program is the establishment of an adult counseling service in the school administration building where a trained and experienced counselor will consult daily with adults who wish to avail themselves of the varied educational opportunities. The adult counselor, in addition to serving as a link between the school department and various state and federal agencies supervising the training or retraining of adult

(Continued on page 44A)

TO HELP TEACH THE ONCOMING GROUPS OF ARCHITECTURAL DRAFTSMEN...

Eberhard Faber has added this new *Wall Chart* of Basic Wiring Symbols to its teaching-aid series. Like *Microtomic Van Dyke* Drawing Pencils these charts enjoy an ever-widening popularity. Pencils are available locally from the supply store which features our famous brand. Our service to teachers—via these charts—is, however, conducted by mail. Charts are *Free* for the asking... Just clip the coupon, and mail.

Actual Size 16½" x 26½"



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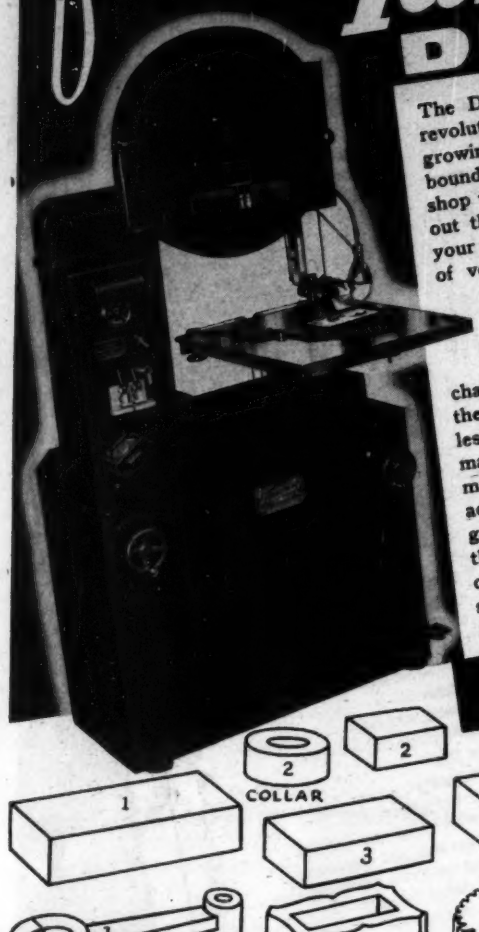

The DI-SAW is truly a machine of revolutionary character — one that is growing in popularity by leaps and bounds. Shortly no metal-working shop worthy of the name will be without them. That's why we say that in your endeavor to do a practical job of vocational training, to fit modern youth to earn their living, the DI-SAW is your No. 1 machine requirement. What makes this machine so revolutionary in character? The fact that in addition to the production of dies, an almost endless variety of tools and parts can be made with it from practically any material including alloy steels. The accompanying diagrams merely suggest the possibilities. By all means get the complete facts concerning this machine. No other single machine offers so wide a field for trained operators. Simply ask for "DI-SAW" bulletin.

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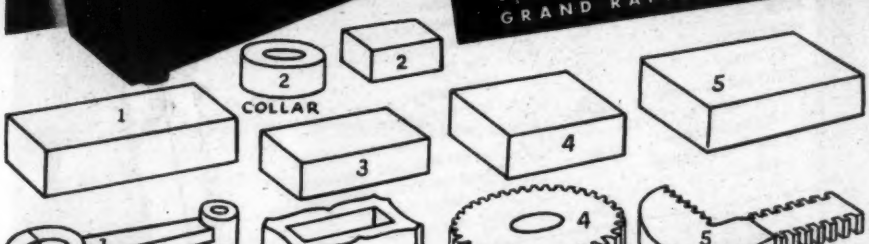

(Continued from page 42A)

students, will work in close conjunction with the regular counseling services of the Providence Public Schools which are maintained in each of the day and evening schools where training is afforded.

♦ The U. S. Forest Products Laboratory, Madison, Wis., has just issued a List of Publications, January 1 to June 30, 1945.

This list contains much useful and interesting information on wood, wood products, and processes involving wood.

New Publications

The Future of American Science

By Kirtley F. Mather, Harry Grundfest, and Melber Phillips. Paper, 19 pages, 5¼ by 7⅛ in. Published by United Office and Professional Workers of America, CIO, 1860 Broadway, New York 23, N. Y.

Recommendations on how to:

1. Turn wartime contributions of science over to peacetime uses.
2. Apply wartime medical discoveries and innovations to peacetime health and sanitary activities.
3. Further governmental participation in scientific research.
4. Discover and develop the scientific talent in the youth of America.

Repair Manual — Two-Cycle Diesel Engines

Prepared by Diesel Engine Division, General Motors Sales Corp., Cleveland, Ohio. Paper, 176 pages, 6 by 9 in. Price, $2.50.

A repair manual covering General Motors Model 71 Two-Cycle Diesel Engines.

The manual is well illustrated and all of the instructions are clearly and tersely stated.

Invasion Leaders: American Military Leaders, 1942–1944

By John R. Graf. Paper, 47 pp., illustrated. 50 cents. McKinley Publishing Co., Philadelphia, Pa.

This is a timely and very readable set of brief biographies of Generals Eisenhower, MacArthur, Marshall, Arnold, Bradley, Clark, Doolittle, McNair, Somervell, and Chennault. A good portrait of the men accompanies each biography.

Architecture in the Netherlands

By Paul Bromberg. Paper, 94 pages, 6⅛ by 9¼ in., illustrated. Published by The Netherlands Information Bureau, 10 Rockefeller Plaza. New York 20, N. Y.

The twelfth in a series of booklets published by The Netherlands Information Bureau. It describes how Holland has adapted modern architecture to express the modest, yet purposeful, spirit of its inhabitants, yet keeping in harmony with new materials and techniques.

Dictionary of Sociology

Edited by Henry Pratt Fairchild. Cloth, 342 pages, 6¼ by 9¼ in. Price, $6. Published by the

(Continued on next page)

ELECTRIC POTTERY KILNS

Several temperature ranges for pottery and ceramics

1. Temperature range to 2000 F°.
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MODERN CARPENTRY BOOKS

SIMPLIFIED CARPENTRY ESTIMATING

By J. Douglas Wilson and Clell M. Rogers

A beginner's text showing how to "take off" from a set of blueprints and specifications a bill of materials for a frame house. Mr. Wilson has taught the subject for many years. The mathematical short cuts were contributed by Mr. Rogers, a mathematics instructor.

1945. 2nd. 288 pages, 123 illus., 60 tables, 5 x 7, cloth, $3.00

CARPENTRY AND JOINERY WORK

By Nelson L. Burbank

Formerly Instructor, Building Vocational High School, Cincinnati, Ohio

The Fourth Edition has been completely revised and set in easy reading type. Designed as a high school beginner's text it includes corollary subjects of Carpentry Mathematics, Architectural Drawing, Blueprint Reading and Business English. A full set of working blueprints and a material list help the student learn estimating. Glossary and Index.

1943. 4th. 248 pages, 1,000 illus., 8½ x 11½, cloth, $4.00

Sent to Instructors on Thirty Days' Examination

Book Department

SIMMONS-BOARDMAN PUBLISHING CORPORATION

30 Church Street — New York 7, N. Y.

(Continued from previous page)

Philosophical Library, Inc., 15 East 40th St., New York, N. Y.

A book that is especially designed to aid students, teachers, researchers, and workers in sociology in the study of their subject.

A Plan to Help You Employ Disabled Veterans and Other Handicapped Persons

American Mutual Alliance, 919 North Michigan Ave., Chicago 11, Ill.

New Magic in Wood

American Forest Products Industries, Inc., 1319 Eighteenth St., N.W., Washington 6, D. C.

A Bibliography of Study Aids on Our Forest Resource and Its Conservation

American Forest Products Industries, Inc., 1319 Eighteenth St., N.W., Washington 6, D. C.

Selecting An Occupation

By C. A. Prosser. Paper cover, 154 pages, 5⅜ by 7¾ in. Price, 60 cents. McKnight & McKnight, Bloomington, Ill.

An information book on the demands and opportunities offered by the many occupations in the workaday world.

It shows the candidate how to find the occupation which he likes, and then directs him to measure his physical and mental assets against the requirements of that occupation.

Construction-Maintenance and Repairing of Aircraft Instruments

By J. A. Gordon. Paper, 29 pages, 7 by 10 in., illustrated. Reprinted by Henry Paulson & Co., from Horological Journal, London, Eng.

A pamphlet describing the design and principles embodied in the aircraft instruments of today.

Which Jobs for Young Workers No. 13, and No. 14

U. S. Department of Labor, Children's Bureau, Washington, D. C.

Unit No. 13 presents the advisory standards for the brick and tile industry; and No. 14, the advisory standards for the converted paper products industries.

The foregoing are brief statements of what jobs are unsuitable, or relatively safe for minors. Apprenticeship provisions also are discussed.

Fitting and Selling Shoes

Bulletin No. 230, Business Education Series No. 16. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price, 15 cents.

This bulletin was developed through the cooperation of the National Shoe Retailers Assn., and the Business Education Service of the U. S. Office of Education.

It consists of 11 units the headings of which are: Shoe Retailing, Past and Present; The Salesman; Greeting the Customer; The Human Foot; Measuring Feet; Factors in Fitting Shoes; Influence of Style; Presentation of Merchandise; Selling Service by Suggestion; Closing the Sale; and, Establishing Customer Relationships.

How to Handle Labor Grievances

By John A. Lapp. Cloth, 293 pages, 5½ by 8¼ in. Price, $4. National Foremen's Institute, Inc., Deep River, Conn.

A thoroughly interesting and instructive book on the handling of the arbitrations in labor grievance cases, and in formulating and interpreting collective bargaining contracts.

The five chapters discuss the subject matter under the following headings: Background and History of Grievance Procedures; Grievances and How to Deal With Them; Outline of Grievance Procedures; Grievance Procedures in Selected Industries; and Problems of Grievance Procedures.

The appendix contains copies of contract provisions related to offenses and their resulting penalties, agreement to arbitrate, employee request form, an outline of minutes of meeting with grievance committee, and a grievance report.

Occupational Instruction

By Elroy Wm. Bollinger and Gilbert G. Weaver. Cloth, 136 pages, 6⅛ by 9¼ in., illustrated. Price, $2.25. Pitman Publishing Corp., New York and Chicago.

A very detailed explanation of how to proceed in analyzing an occupation in order to discover what facts and skills must be conveyed to the student, and out of this data to construct a comprehensive and teachable course.

- Heavy bronze bearings
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- 11¼-inch swing
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- Large hardened and ground spindle
- Extreme accuracy
- Convenient controls
- Underneath V-belt motor drive
- All Steel Bench

. . . compare a SHELDON S-56 Precision lathe with all other 10" lathes in the moderate priced field, and you'll find more accuracy, more capacity, more convenience, more design, more quality . . . from any angle just more lathe.

The SHELDON S-56 lathe has a bed length of 56", with rigid T-girted bed with 2 V-ways and 2 Flat ways which are ground and hand scraped to .0005" of both lateral and parallel alignment. Lead screws are cut on the finest Pratt & Whitney "super precision" lead screw machine. The S-56 lathe with 56" bed is mounted on a rigid 5 drawer steel bench (S-44 with 44" bed on a 4 drawer steel bench) which houses an efficient 4-speed (8 spindle speed) underneath motor drive. Each come with full quick change gears, power longitudinal and cross feeds and standard big lathe features.

SHELDON MACHINE CO., INC.
4244 N. Knox Avenue, Chicago 41, U.S.A.

Builders of Good Lathes Since 1919

Building Insulation

By Paul D. Close. Cloth, 328 pages, 5¾ by 8½ in., illustrated. Price, $3.50. American Technical Society, Chicago, Ill.

This is the second edition of an authoritative book on the principles and application of heat and sound insulation for buildings. It furnishes the answers to *how much*, *what kind*, and *where*, and *how* to apply insulation material to conserve fuel or to deaden objectionable sounds.

Machine Drawing

By Carl L. Svensen. Cloth, 280 pages, 6⅛ by 9⅛ in. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York City.

This is the third edition of this introductory course in machine design. The subject matter shows the application of drawing to threaded fastenings, welded and riveted construction, dimensioning, sketching, machine details, bearings, belts and pulleys, shafting and coupling, jigs and fixtures, gears and cams, and piping drawings.

How You Can Get a Better Job

By Willard K. Lasher and Edward A. Richards. Cloth, 206 pages, 5¾ by 8½ in., illustrated. American Technical Society, Chicago, Ill.

A book for young as well as old job seekers. The authors have divided the subject matter into four parts in which are discussed how the human element, self-management, selling yourself, and getting ahead enter into that most serious problem of how to get a better job.

How to Develop Profitable Ideas

By Otto F. Reiss. Cloth, 202 pages, 6¼ by 9¼ in., illustrated. Price, $3. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York City.

The author of this interesting book heads his introduction "Planned Brainstorms." He emphasizes that most people cannot wait until they spark an idea. They have to learn how to develop them cold.

He then proceeds to show how others have developed such ideas and shows the reader how he, too, may develop profitable ideas as the need for them arises.

Careers in Science

By Philip Pollack. Cloth, 222 pages, 5½ by 8¼ in., illustrated. Price, $2.75. E. P. Dutton & Co., Inc., New York City.

With the progress made in all of the fields of science during the past few decades, informa-

(Continued on page 52A)

TOMORROW IS A CHALLENGE

In healing the wounds of these years of havoc and remaking the world we hope for, few tasks are of greater importance than creating the healthy interest, poise and self-confidence which comes of hands and minds which are creatively employed. To those to whom this work is entrusted this is indeed an inspiring challenge. We at American Handicrafts believe we can be of real help. Our New Catalogue of 80 pages gives specific details on the long list of handicraft materials, kits and tools which we make available. We quite truly believe you will find it A Real Contribution.

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Shop Equipment News

New Products—Publications

THREE NEW DI-ACRO BENDERS

Three new Di-Acro Bender models, which have been thoroughly redesigned and re-engineered have just been completed.

The operating friction on these new benders has been decreased greatly by the installation of Torrington Roller Bearings. Sizes 2 and 3 of the Di-Acro Benders have been equipped with instantly reversible lever control cams, which allows the operator a choice of either right or left hand forming direction. Interference, which may develop when forming several intricate shapes successively in a single piece, can be quickly eliminated through this two-way operating feature by simply reversing the forming direction of the machine.

Forming tubing without inside supporting mandrel on a Di-Acro Bender

Di-Acro Benders are highly versatile and can be arranged right on the job for all types of forming in all ductile materials including round, half-round, square, and hexagon rod, tubing, angle, channel, moulding strip stock and bus bar (formed both flat or edgewise).

O'Neil-Irwin Manufacturing Co., Minneapolis 15, Minn.

For brief reference use IAVE—810.

PARALLEL-RESISTANCE AND SERIES-CAPACITANCE CALCULATOR

A new Parallel-Resistance and Series-Capacitance Calculator is now available which is essentially a slide-rule device. It is designed to provide a rapid and accurate means of determining the reciprocal of the sum of two reciprocals, and a single setting of the slide automatically align all pairs of a and b values which will satisfy the equation for any given value of x. This calculator

New Calculator

indicates in one setting the numerous pairs of resistances which may be connected in parallel, or capacitances in series, to provide any required resistance or capacitance value. The rule has a range of 1 ohm to 10 megohms; and 10 mmfd. to 10 mfd. However, the capacitance and resistance figures on the face of the rule can just as well serve to represent inductance, impedance, reactance, or other units which can be handled in a similar manner. Thus, the calculator becomes equally valuable in solving problems involving inductance in parallel, coupled inductance, numerical magnitude of impedance, parallel reactance, and the like.

For further information write to Allied Radio Corp., 833 West Jackson Blvd., Chicago 7, Ill.

For brief reference use IAVE—811.

TAKE-ABOUT SURFACER

The Model A-3 takeabout surfacer is a streamlined machine designed for durability and faster surfacing.

It may be used in metal and woodworking plants, pattern shops, maintenance departments, assembly lines, furniture manufacturer's plants, carpenter shops, schools, boat building industries, for removing paint and on refinishing jobs.

Model A-3 take-about surfacer

It is equipped with Universal DC-AC, 25-60 cycle, single phase, either 115- or 220-volt ¾ h.p. motor; and uses a 3 by 24-in. belt which runs at a speed of 1600 s.f.p.m.

For further information address The Porter-Cable Machine Co., Syracuse 8, N. Y.

For brief reference use IAVE—812.

METRIC GAUGE BLOCKS

The makers of DoAll precision gauge blocks and instruments announce a new series of metric gauge blocks designed to fill the needs of domestic and foreign manufacturers working in the metric system.

These blocks are offered in two grades that correspond in accuracy with the English system. Inspection quality guaranteed accurate within plus or minus .0001mm., and working quality guaranteed accurate within plus or minus .0002 mm.

The use of these gauge blocks eliminates the conversion of English measurement to metric, and offers a wide range of measuring combinations.

The set consists of 38 blocks plus 2 wear blocks (of tungsten carbide in the inspection grade), and is capable of producing over 100,000 combinations ranging from 1.01mm. to 100mm. in increments of .01mm. A special 1.005mm. block in the set makes possible special combinations for closer tolerances where needed.

For further information address Continental Machines, Inc., 1301 Washington Ave., South, Minneapolis 4, Minn.

For brief reference use IAVE—813.

NEW METHOD FOR MAKING PERSPECTIVE DRAWINGS

The Pomeroy Stereograph Perspective Drawing Machine produces a perspective view as stereoscopic pairs showing length, width and depth, or if desired, as a single perspective drawing, and reduces substantially the time and cost in making scale perspective drawings.

With the Pomeroy Stereograph it is not necessary to use gadgets or the ordinary equipment of the drawing board to find vanishing points. This unusual device is also extremely valuable for solving problems in geometry and equally ideal in descriptive geometry.

The Pomeroy Perspective Drawing Machine can produce third dimensional graphs, create space curves, and through its three dimensional effects, also show the internal construction of highly complex mechanisms.

The drafting machine used to produce these

(Continued on page 48A)

JUST ONE

JUST ONE of numerous government radio and electronic items now available through the Hallicrafters Co., Chicago, agent for Reconstruction Finance Corporation.

This is a Keyer TG-10-F, an automatic unit for providing code practice signals from inked tape recordings. Excellent for group instruction, sufficient power to operate up to 300 pairs of head phones. Can be adapted as amplifier of 10 to 15 watts output for use with crystal mike or phono pick up. Completely checked and reconditioned by Hallicrafters engineers. Send coupon for further details and lists of other available items.

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CLAYBORNE ENGINE OVERHAUL STAND

The Clayborne Manufacturing Co., 209 South LaSalle Street, Chicago 4, Illinois, announce a new style adjustable Universal Engine Overhaul Stand, Model 201, which handles all in-line Automotive Engines to approximately 600 lbs. weight. It also positions transmission, differentials and rear axle assemblies.

It is ideal for instruction and for use in rebuilding all types of engines (except the V-type) where the cylinder banks are not brought into vertical position for cylinder boring by a stand of end-roll over type. Pictured to right, the stand is shown with a Studebaker 8-cylinder engine.

This stand has an Indexing device on each side rail—one has spring—one is plain. Mounts approximately 80% of automotive engines without resorting to the 6-inch expansion. Trunnion castings are offset 2 inches to increase clearance for clutch housings. The stand is completely mobile, safe and easy to use with plenty of room. This stand handles complete engine with oil pan, clutch housing and accessories. It is sturdily constructed of heavy 1½" x 1½" x 3/16" mild steel angle stock, with two straight and two swivel casters with brake mechanism. Overall length (closed)—34 inches; Overall width—27⅛ inches; Overall height—37½ inches; Finish—Gray enamel; Shipping weight—approximately 145 lbs.

Completely illustrated and descriptive folders are available on Automotive, Aviation and this new style adjustable Universal Engine Overhaul Stand, Model 201. Also on the Ford V-8 Engine Overhaul Stand, which with extra frames handles Chevrolet and Dodge-Plymouth Short Block Assemblies. Large stands for heavy bus, truck and tractor engines are available as well as for aircraft engines. Address your request or inquiry to: Clayborne Manufacturing Co., 209 South LaSalle Street, Chicago 4, Illinois.

(Continued from page 46A)

drawings, is constructed of duraluminum with high carbon steel for the guides and rotating members. It is 32 in. long, 3¼ in. wide, and mounted between two drawing boards. At the top is a hair-line point finder 20 in. long, and at the bottom is the drawing straight-edge 20 in. long, by means of which the operator can make the perspective drawing.

The machine is so made that points obtained from orthographic projections of the object to be drawn can be instantly transferred to the lower drawing board where the draftsman can produce perfect perspective drawing. After the first perspective drawing has been made, its stereo-component drawing can be produced quite simply by shifting the viewpoint the correct interpupillary distance. This change is accomplished by means of a simple adjustment.

For complete descriptive literature, write to Pomeroy Stereograph Co., Inc., 1783 E. 11th St., Cleveland, Ohio.

For brief reference use IAVE—814.

THREE NEW TRAINING FILMS

The International Theatrical and Television Corporation, 25 West 45th St., New York 19, N. Y., have just announced three new vocational films. These are on leather making, silversmithing, and silk-screen process in lithography. The films run approximately 20 minutes each. Through excellent guidance in scripts and background material from leading vocational teachers and rehabilitation workers, these films are usable both for secondary grades in schools, and for adult professional and hobby education. These two-reel film subjects rent for $3.50, and sell for $60 less 10 per cent for schools.

For brief reference use IAVE—815.

LIGHTWEIGHT ELECTRODE HOLDER

A new light (22 oz.) insulated holder for welding electrodes has been announced by The Lincoln Electric Co., Cleveland, Ohio.

It has a current rating of 300 amperes with ample capacity for overload, and will handle electrodes ranging from 1/16 to ¼ in. diameter inclusive.

The jaws are made of high conducting and wear resisting copper alloy known as "Lincalloy," which will withstand rough treatment. They are fully guarded from contacting the work by a durable spring steel insulating guard that is easily replaceable. The trigger of the holder is of molded, heat-resisting inorganic material.

For brief reference use IAVE—816.

A GOOD BOOK FOR THE GEAR CUTTER

"Cutting Gear Teeth on a Milling Machine" is a new booklet that has just been published by the Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

The book gives explicit directions for cutting teeth on spur, bevel, helical, and worm gears. It also contains much information and many helpful formulas for solving the problems which confront the mechanic who has to cut gears on the milling machine.

For brief reference use IAVE—817.

JOHANSSON GAUGES

The little 24-page booklet entitled "He Measured in Millionths" by James Sweinhart gives an exceedingly interesting, if brief, story of man's achievements throughout the ages. In it he touches upon the progress made by the ancients in mathematics, astronomy, and science; then points out the series of new inventions which followed the improvement which Watt made on the steam engine; describes Edison's almost miraculous accomplishments and the many new inventions which they liberated; and then describes the painstaking efforts of Carl Edvard Johansson, who, with his gauge blocks, refined tolerances of a tenth of a thousandth to precision methods demanding an accuracy of millionths of an inch.

He also relates that the union of effort of the Swede Johansson and the American Ford, when they worked together in manufacturing Johansson's Standard Gauge blocks for the North and South American fields of trade, did much to enrich the lives of millions of men.

Copies of this booklet may be obtained by writing to the Ford Motor Co., Dearborn, Mich.

For brief reference use IAVE—818.

CARBIDE TOOL GRINDER

Bulletin No. 322 just published by The Baldor Electric Co., St. Louis, Mo., describes an improved carbide tool grinder designated as their series 500.

This grinder has a 6 by 12-in. tool table which can be adjusted up to an angle of 45 deg. It also is provided with a large water pan at each end, and a water pot with spout for moistening either wheel.

For brief reference use IAVE—819.

NEW CATALOG ON THE STANLEY ROUTER-SHAPER

Catalog No. 607 describes a very versatile tool which will be found very useful in the school shop, the home workshop, and in the commercial wood shop.

The Stanley Router-Shaper can be bought piece by piece, starting with the No. 10A hand router with which many operations can be accomplished. Then attachments for beading, fluting, shaping, dovetail cutting, and the like, can be added as the need arises.

The speed of the motor is 18,000 revolutions per minute. This assures smooth cuts and makes sanding practically unnecessary. The router may be plugged into any light socket.

Ask for Catalog No. 607, Stanley Electric Tools, Division of the Stanley Works, New Britain, Conn.

For brief reference use IAVE—820.

NEW EDUCATIONAL FILM GUIDE

A comprehensive description and classification of 2047 educational motion pictures is provided by the new Bell & Howell guide to its Filmosound Library resources in this field. The book embodies many novel cataloguing devices intended to streamline the job of finding any film on any subject. Visible index tabs provide a "thumbnail film finder" that needs no key. A combined title and subject index at the back gives film numbers,

(Continued on page 50A)

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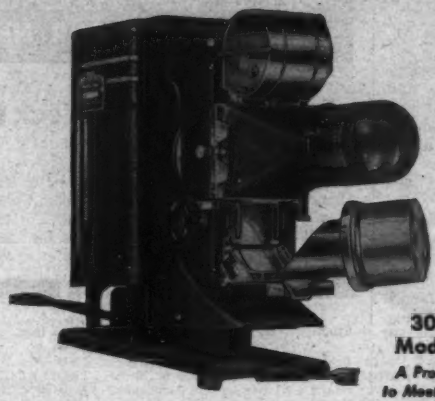

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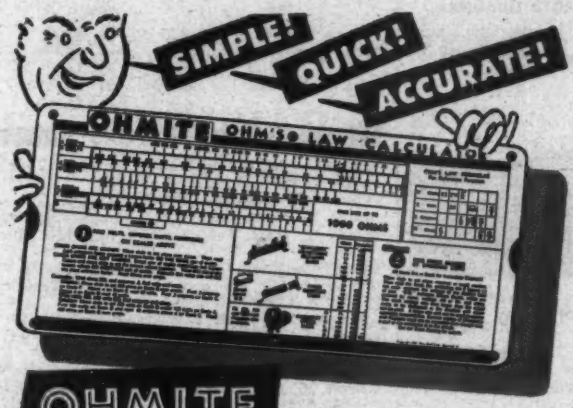

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(Continued from page 48A)

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NEW SOUND EQUIPMENT CATALOGS

Two new folders presenting complete listings of "available now" sound equipment units and sound accessories, and featuring illustrations and detailed descriptions of the complete Concord line of amplifiers, intercommunication systems, recording equipment, and accessories, may be obtained from the Concord Radio Corp., 901 W. Jackson Blvd., Chicago 7, Ill., or 265 Peachtree St., Atlanta 3, Ga.

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JEWELS OF INDUSTRY

A new folder just released by Continental Machines, Inc., manufacturers of precision gauge instruments, points to the significance of Eli Whitney's dream of interchangeability, and his important contribution to industry which has developed today's system of mass production.

Modern industry's dependence on "Jewels of Industry" is shown by gauge blocks and gauge instrument applications taken from the company's film, "Precision Measurements in Industry." These applications point to the increasing vigilance necessary for quality control of production now and in the postwar era.

Copies of this informative folder are available upon request from Continental Machines, Inc., 1301 Washington Ave., So., Minneapolis 4, Minn.

GLUE FIRM OCCUPIES ENLARGED QUARTERS

The Franklin Glue Co., Columbus, Ohio, now occupies the two-story brick building shown in the accompanying photograph.

Franklin Glue Company

The company manufactures Franklin Liquid Hide Glue and Bondwood Powdered Casein Glue.

A CORRECTION

The Engineering Manufacturing Company has opened the salesroom, shown herewith, at 470 N. Michigan Ave., Chicago 3, Ill. The address given in the June issue of this magazine was in error.

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18 ga.	4"	6.1	.12	1.32	.41
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	6"	2.7	.21	2.31	.41
	7"	2	.28	3.08	.41
	8"	1.6	.38	4.18	.41
	10"	1	.60	6.60	.42
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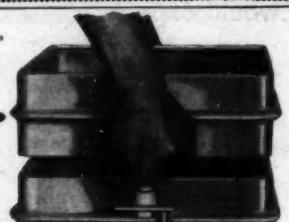

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(Continued from page 45A)

tion on the possibilities for the young worker who is preparing to enter one of these fields, is particularly timely.

The material in this book interestingly portrays what confronts those who want to enter the realm of the sciences, and specifically describes careers in chemistry, physics, biology, and geology.

Plastics

By J. H. DuBois. Cloth, 447 pages, 5¾ by 8⅛ in., illustrated. Price, $4. American Technical Society, Chicago, Ill.

This is the third edition of this authoritative book on that interesting material known as plastics. The book is essentially written for the user rather than for the chemist. A new section has been added to bring it abreast of modern developments.

The book contains 214 illustrations and there are 52 tables containing useful data.

Simplified Carpentry Estimating

By J. Douglas Wilson and Clell M. Rogers. Cloth, 288 pages, 5 by 7¾ in., illustrated. Price, $3. Published by Simmons-Boardman Publishing Corp., 30 Church St., New York, N. Y.

This material was used by the author in his classes at the Frank Wiggins Trade School in Los Angeles, Calif., before it was put into book form. While it was originally used for instructing beginners, this second edition will be found quite suitable as a guide for builders and others who have to do estimating on buildings jobs.

The Industrial Housekeeping Manual

By R. F. Vincent. Cloth, 115 pages, 5½ by 8¼ in. Price, $2.50. National Foremen's Institute, Inc., Deep River, Conn.

A book for those who have to supervise or take care that the office, plant, or warehouse are kept clean and orderly.

The 12 chapters in this worth-while little book emphasize the importance of work methods and safe methods of doing the work. The duties of every member of the crew are clearly outlined, and the methods of cleaning floors, sanitary fixtures, and lockers, windows, etc., are thoroughly explained.

The selection of soaps and cleaning equipment, vermin extermination, record keeping, and the making of working schedules also is discussed.

There Can Be Jobs for All

By Maxwell S. Stewart. Paper, 32 pages, 5⅜ by 8⅛ in. Price, 10 cents. Issued by Public Affairs Committee, 30 Rockefeller Plaza, New York City.

Public Affairs Pamphlet No. 105 is a clearly written summary of Sir William Beveridge's "Full Employment in a Free Society."

Social Leadership

By C. F. Klinefelter and Charles T. Battin. Paper, 42 pages, 5⅞ by 9⅛ in. Price, 10 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Vocational Division Bulletin No. 231, Defense Training Series No. 4, is a very helpful presentation of conference discussion techniques.

Industrial Safety Charts

Published by U. S. Department of Labor, Division of Labor Standards. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. Price, 5 cents per copy, or $3.75 per hundred copies.

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Training for Industry

A Report by the New York State Education Department, Division of Vocational Education, Albany, N. Y. Paper cover, 8⅜ by 10⅞ in., illustrated.

This report was prepared under the direction of Dr. S. Lewis Land while he was supervisor of industrial education and industrial teacher training in New York State.

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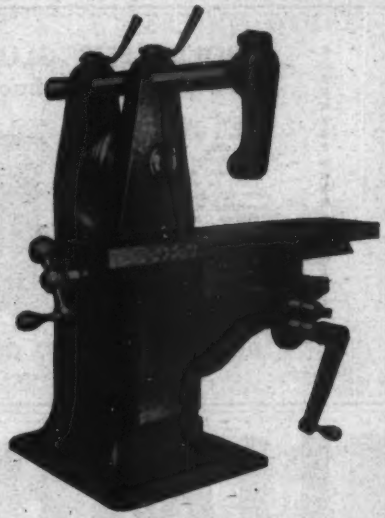

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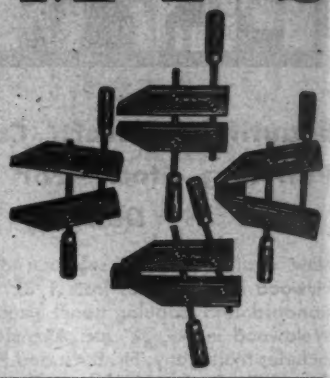

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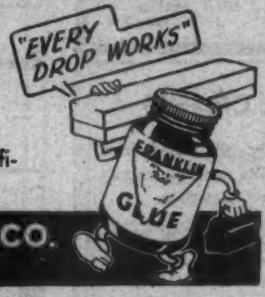

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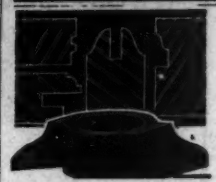

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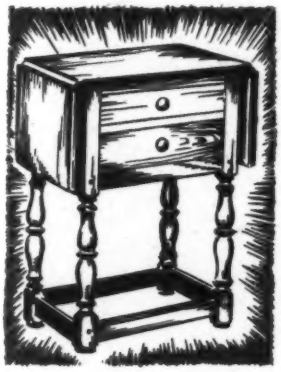

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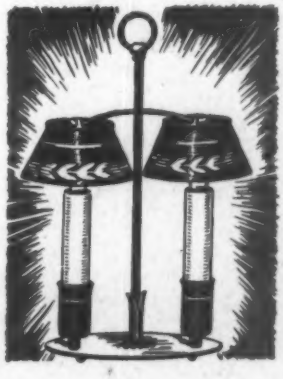

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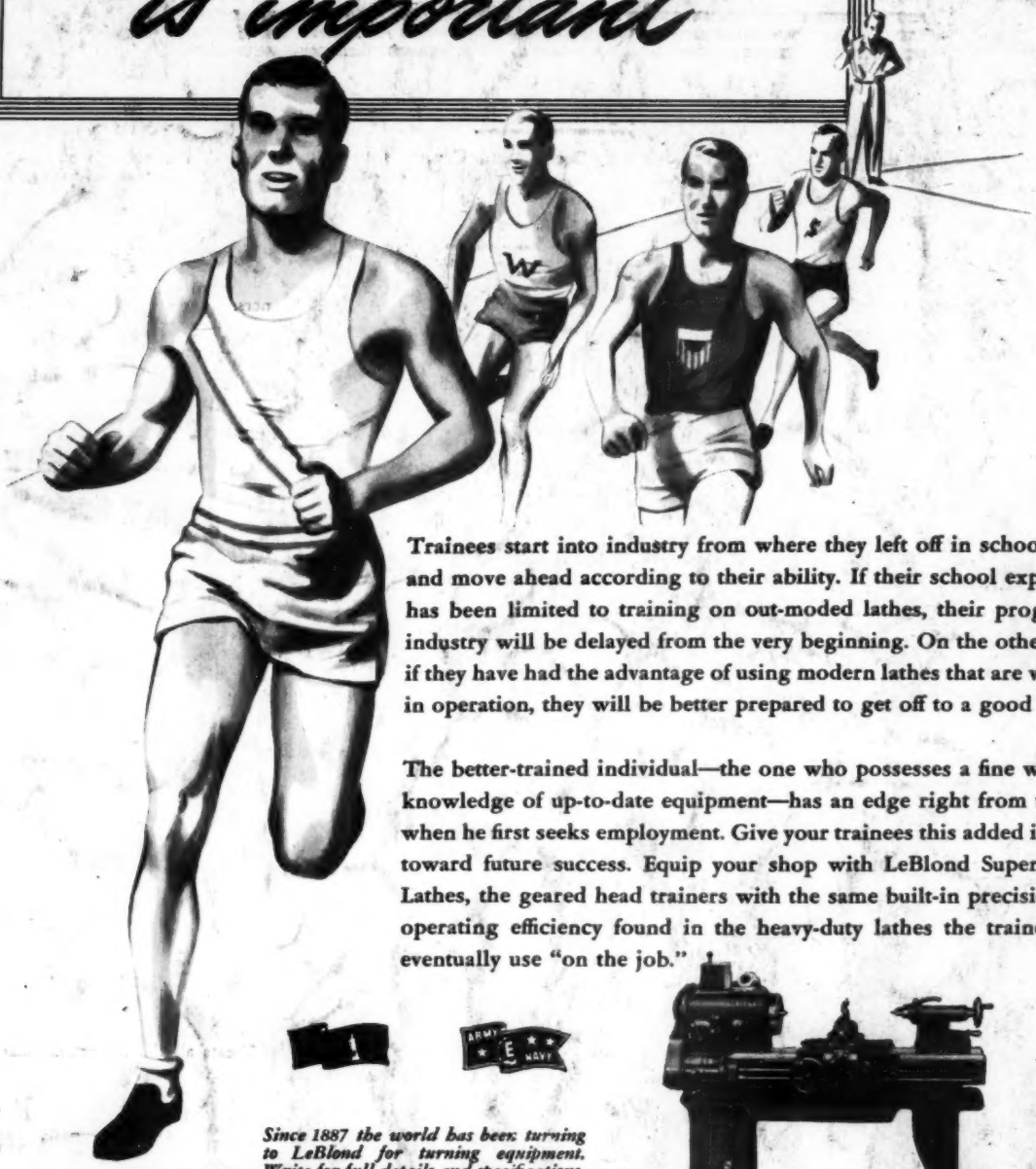
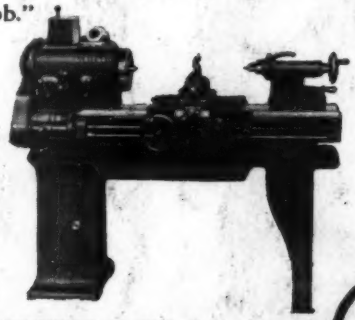
A GOOD START
is important



Trainees start into industry from where they left off in school shops and move ahead according to their ability. If their school experience has been limited to training on out-moded lathes, their progress in industry will be delayed from the very beginning. On the other hand, if they have had the advantage of using modern lathes that are versatile in operation, they will be better prepared to get off to a good start.

The better-trained individual—the one who possesses a fine working knowledge of up-to-date equipment—has an edge right from the day when he first seeks employment. Give your trainees this added impetus toward future success. Equip your shop with LeBlond Super Regal Lathes, the geared head trainers with the same built-in precision and operating efficiency found in the heavy-duty lathes the trainee will eventually use "on the job."



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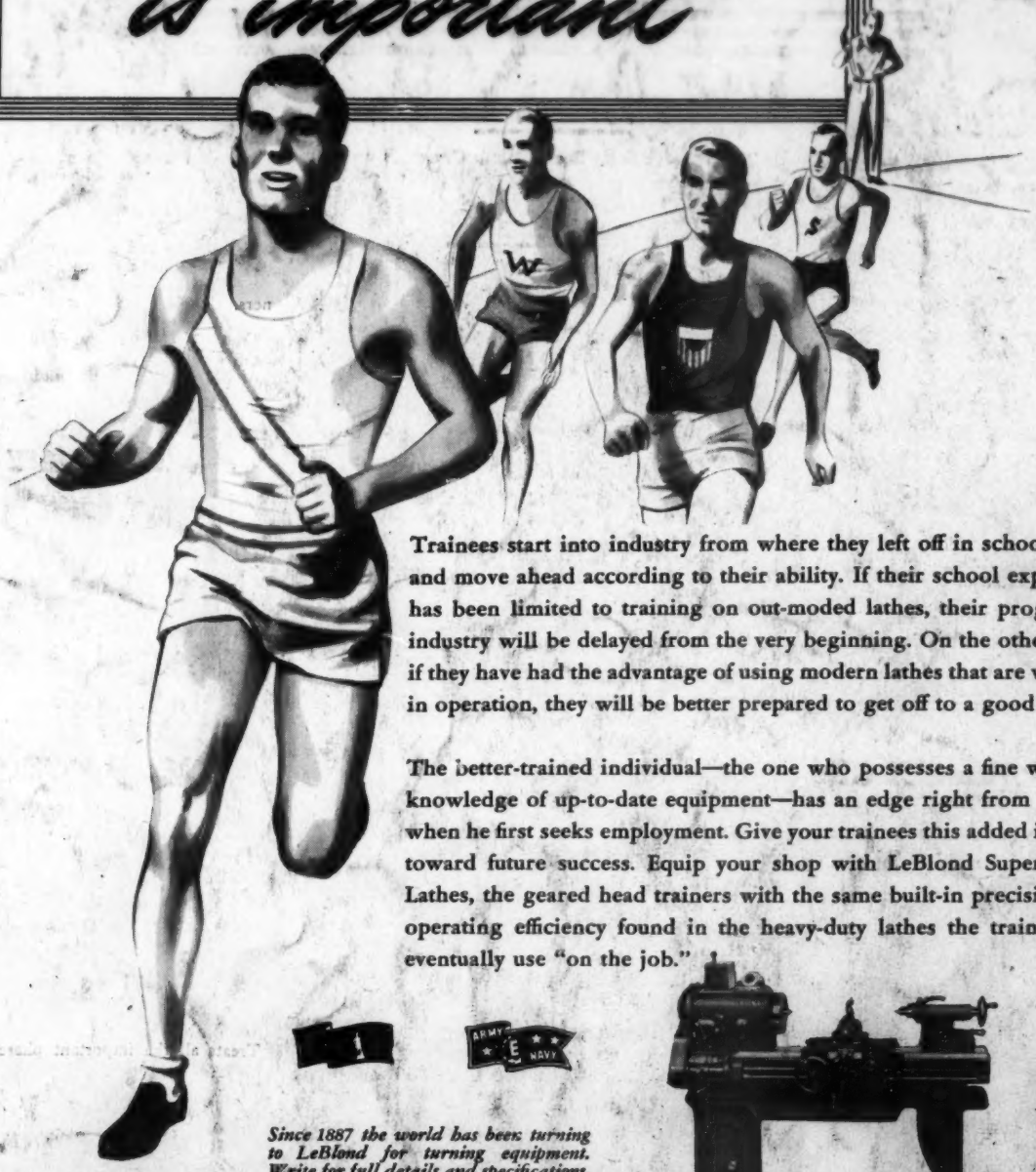

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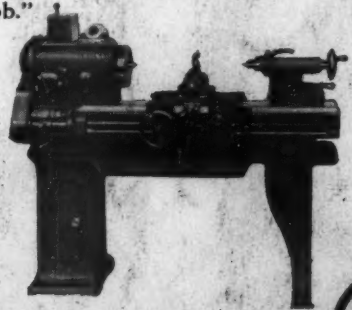

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